Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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Vol. 135 **September 1, 1959** **No. 5**

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NORDEN VETERINARY NEWS

No. 2

Peace of Mind & Swine Erysipelas

No one thus far has suggested that EVA® (Norden) be substituted for sleeping pills. But several practitioners have suggested that when you want to sleep better nights, you'll find real peace of mind if clients' swine droves have been vaccinated with EVA (Erysipelas Vaccine Live Culture, Avirulent).

Here's why EVA is preferred. EVA has proved itself in millions of swine. *Live culture* means rapid, highly antigenic response with immunity normally lasting through marketing age. *Avirulent* means EVA provides remarkable freedom from local and systemic reactions—cannot seed premises or produce infection in swine or man.

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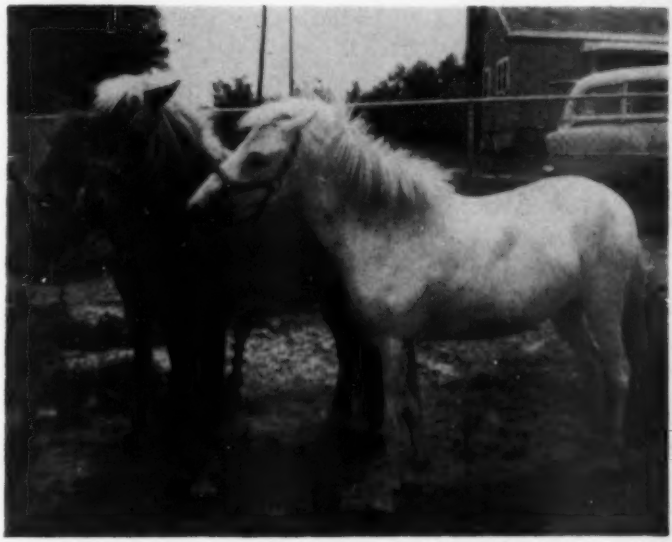
For the small animal practitioner, this formulation is available as Eye-Med in ½ oz. plastic dropper bottles.

New Sling Simplifies Lifting Downer Cows

"It makes me shudder to think of all the cows I have lost because I didn't have that sling," an Ohio veterinarian stated recently, referring to the Boyd Cattle Lifter Sling (Norden). Fitted with adjustable loops to grip the "downer cow's" lumber coxae, the sling is used with a block and tackle or other power lift to greatly simplify the task of getting animals to their feet.

Valuable for complicated milk fever cases and paralysis after calving, the lifter sling also facilitates diagnostic work and surgery.



Evaluation of a New Antibiotic

F. M. Hall, D.V.M., Marietta, Georgia

Specific affinity for respiratory and mammary tissues is the unique characteristic of an antibiotic which has been introduced containing diethylaminoethylesterpenicillinGhydriodide in combination with dihydrostreptomycin (Iomycin-Norden). Because of this special affinity, Iomycin provides up to 5 times greater concentration in lung and mammary tissues with therapeutic levels lasting eight to twelve hours.

The following case reports are an attempt to evaluate the effectiveness of this product in domestic animals.

Shetland mare pony: Call was received to see a two year old pony shipped in from the North. Temperature was 105°, respiration rate 40, and pulse rate 50. The animal had a cough and a mucopurulent discharge from both nostrils. 4 cc of Iomycin were injected in split dosage of 2 cc IM in the neck muscles. The next day the nasal discharge had ceased, only a slight cough remained, and the animal was eating well.

Mare pony: 12 years old, approximately 500 pounds, had labored and difficult breathing. Both nostrils had a greenish-foamy discharge; temperature was 106° F. The guttural pouches were filled with pus and air, and the submaxillary glands were visibly swollen. 6 cc of Iomycin were injected in three sites, followed the next day by the same procedure. The owner was advised to place feed and water on the ground to facilitate drainage. Mare made an uneventful recovery in 72 hours.

Guernsey cow, 4 years old, with 3-day-old calf. Temperature 106°—right front quarter of mammary gland swollen and turning blue. One cc oxytocic principle was injected IV and 8 cc Iomycin injected IM. Owner was advised to milk out 6 times daily. Affected quarter returned to normal in 48 hours.

Weimaraner bitch, 4 years old, weight 75 pounds, had just weaned pups. Left No. 1, 2 and 3 mammae were ulcerated and draining. 1½ cc of Iomycin was injected IM every twelve hours for 2 days, and 2 doses of 1½ cc every 24 hours. A tranquilizer was administered to prevent licking of the mammae which were dusted daily with Sulf-Urea Powder. Healing was complete in 5 days.

Fair to good results have followed routine use of Iomycin in the distemper complex. Tracheo-bronchitis in dogs of all ages respond to Iomycin if given every 12 hours for 4 days.

Iomycin in Horses

Reports from veterinarians indicate that Iomycin has produced exceptional results when used for the distemper-strangles-influenza complex in horses.

Journal of the American Veterinary Medical Association

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EDITORIAL STAFF: W. A. Aitken, *Editor Emeritus;* Donald A. Price, *Editor in Chief;* H. E. Kingman, Jr., *Managing Editor;* Eva G. Bailey, *Assistant to the Editors.*

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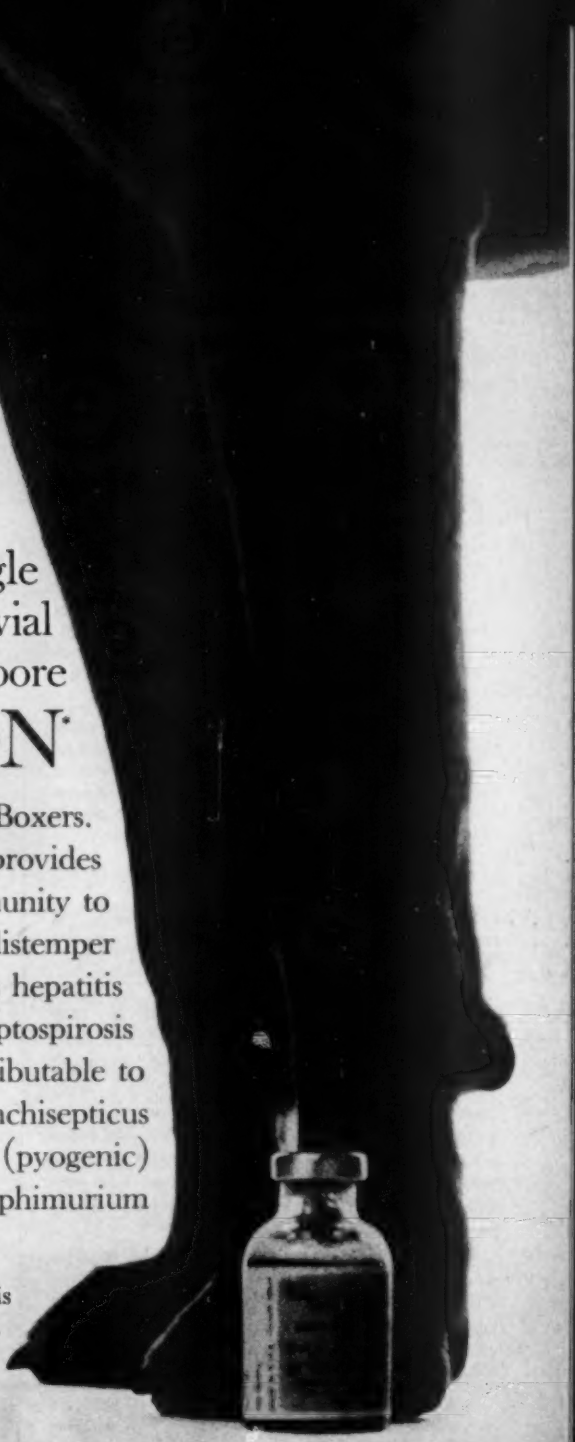

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Correspondence

Sir:

On reading my review of Hutt's book, "Genetic Resistance to Disease in Domestic Animals," in the May 15 JOURNAL, I was disappointed to see that an editorial deletion had changed the meaning. In part, it should have read:

". . . When hatching eggs of the resistant stock were entered in a Random Sample test for three years, the resistant stock was lowest in mortality from all causes, and was highest in income for chicks started. *Private breeders were stimulated to adopt the method, with gratifying results.*

The above is in direct contrast to most other experimental attempts to raise the level of resistance to disease in poultry or other farm animals. For various reasons they have not been followed up by practical application."

Not only did the book emphasize that leucosis of chickens was one disease where the breeders were using the method of breeding for genetic resistance, but it is my understanding that most of the big breeders of egg-producing fowls are now deliberately exposing their birds to leucosis in order to select for resistance to that disease.

s/BRUCE L. WARWICK

[The underlined sentence was omitted from the original book review.—ED.]

✦ ✦ ✦

July 28, 1959

Sir:

The Executive Committee of the American Thrift Assembly would like us to bring to your attention the outstanding presentation made by Dr. Jack O. Knowles of Miami, Fla., of your association. Dr. Knowles' testimony on H.R. 10 before the Senate Finance Committee was very thorough and delivered in such a manner as to impress the members of the committee.

On this occasion, we would also like to commend Gen. J. A. McCallam of your Washington office. You are indeed fortunate to have him on your staff, and we consider it a real privilege to cooperate with him.

Sincerely,
s/F. JOSEPH DONOHUE
Chairman
s/ROBERT E. ANSHELES
Executive Director
American Thrift Assembly for Ten Million Self-Employed, Inc.

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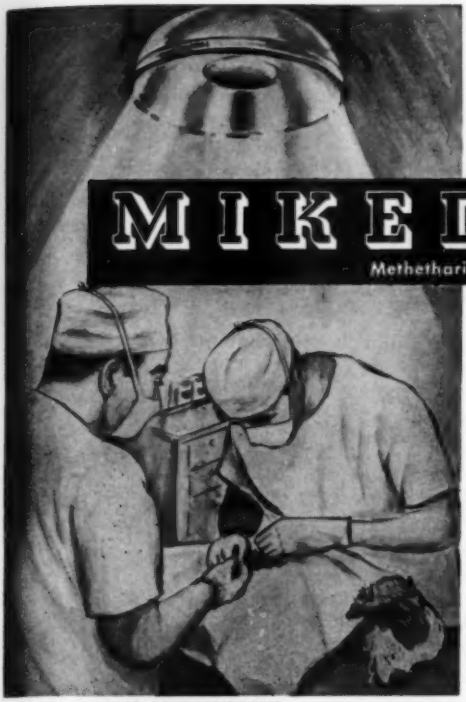

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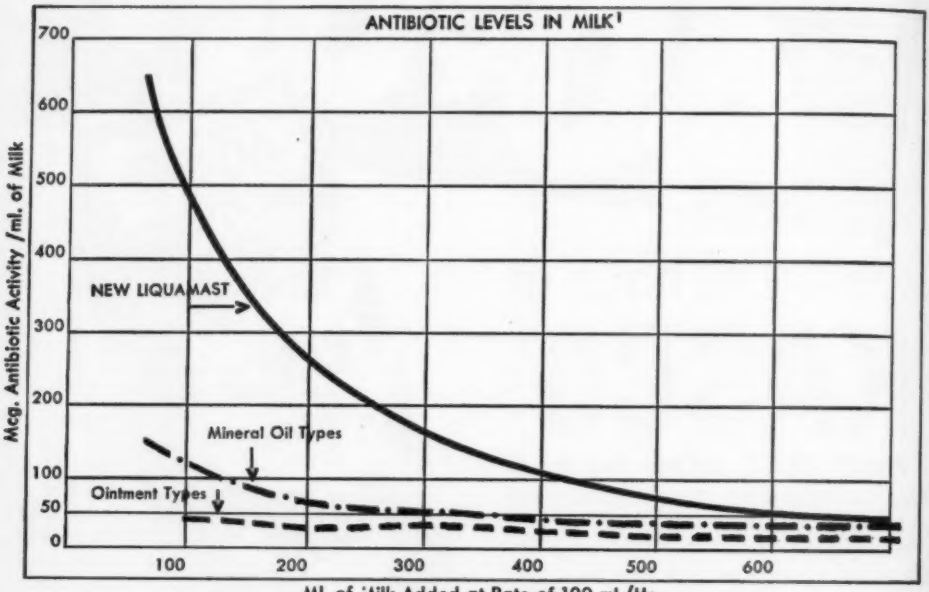

[1]Microbiological Assay, Agricultural Research and Development Dept., Chas. Pfizer & Co., Inc.

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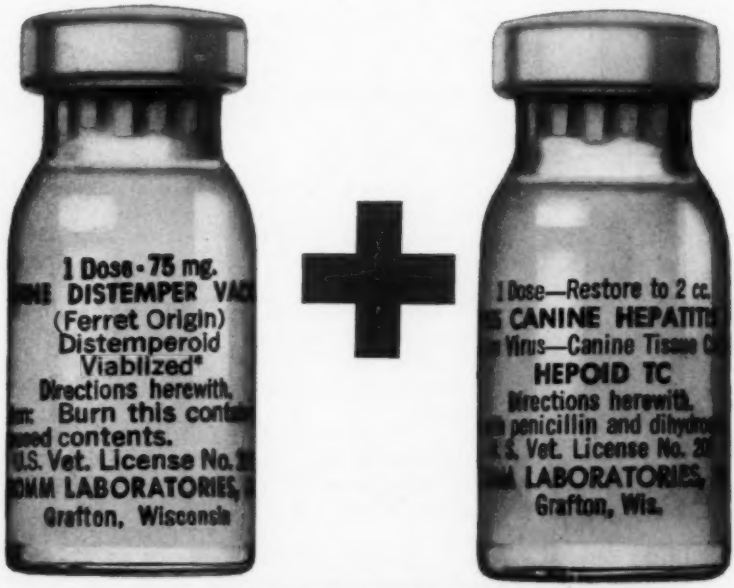

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LEGISLATION

Graduate Training, Public Health

Graduate training, public health personnel, H. R. 6325 (see JOURNAL, Aug. 1, 1959, adv. p. 12), is Public Law 86-105, approved by the President on July 23.

H.R. 6436 Amended

Amended Federal Insecticide, Fungicide, Rodenticide Act, H.R. 6436 (see JOURNAL, June 1 and June 15, 1959, adv. p. 12), cleared for the President on July 29.

Commissioned Corps P.H.S.

Cleared Senate July 24 for House Action, Commissioned Corps P.H.S. bill, S. 2220 (see JOURNAL, Aug. 15, 1959, adv. p. 16).

Health Benefits, Federal Employees

Federal Employees health benefits bill, S. 2162 (see JOURNAL, Aug. 1, 1959, adv. p. 12), passed Senate July 16, 1959, House Committee hearings not concluded August 5, date this item was submitted.

NEW BILLS

To Amend Title II, Social Security Act

To remove limitation upon amount outside income individual may earn while receiving benefits: H.R. 8300, Rep. Oliver (D., Maine).

To increase to $5,000 a year amount outside earnings permitted without deductions from benefits: H.R. 8322, Rep. Roosevelt (D., Calif.); H.R. 8414, Rep. McFall (D., Calif.), would limit amount to $3,000

To provide full benefits age 60 for women, age 62, men; increase benefits and earnings on which benefits computed; more liberal conditions for disability benefits; provide hospitalization and surgical insurance: H.R. 8442, Rep Bennett (R., Mich.).

To preserve the insurance rights of individuals who, because of disability, have lost at least 60 per cent of their earning capacity: S. 2459, Sen. Kefauver (D., Tenn.).

National Science Foundation Act

Amend National Science Foundation Act of 1959, to initiate and support basic scientific research and programs to strengthen scientific research in mathematical, physical, medical, biological, and other sciences by contract or other arrangements (grants, loans, etc.), to support such research. Also authorize scholarships and graduate scholarships for scientific study or work in fields mentioned above, at American or foreign institutions: S. 2468, Sen. Hill (D., Ala.).

GS-9 New Entrance Grade for Veterinarians

Grade GS-9 has been authorized by the Civil Service Commission as the entrance grade for veterinarians employed by the U.S. Department of Agriculture at $6,135 per annum (see JOURNAL, Aug. 15, 1959, adv. p. 36).

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WASHINGTON NEWS—*Continued*

Armed Forces Institute of Pathology

Provides for director of Armed Forces Institute of Pathology to be brigadier general or rear admiral: S. 1925, Sen. Jackson (D., Wash), H.R. 8452, Rep. Rhodes (R., Ariz.). Both identical with H.R. 7871 (see JOURNAL, Aug. 1, 1959, adv. p. 14).

Federal Property and Administration Services Act

Amend Federal Property and Administration Services Act of 1949, to permit donation of foreign excess property to medical institutions, health centers, colleges, etc., for use in foreign countries: H.R. 8398, Rep. Monagan (D., Conn.).

MISCELLANEOUS

Oregon Modified-Certified Brucellosis Area

Oregon declared modified-certified brucellosis area, effective July 2, 1959. According to U.S.D.A. release July 24, Oregon is the 20th state so certified.

Animal Care Panel Meeting

Tenth annual meeting of the Animal Care Panel will be held in Washington, D.C., October 29-31, 1959, at the Sheraton Park Hotel. Inquiries relative to the meeting should be addressed to the Chairman, Dr. Willard H. Eyestone, Bldg. 10, National Institute of Health, Bethesda 14, Md.

Col. Townsend Appointed Director A.F.I.P.

Col. Frank M. Townsend, U.S.A.F. (M.C.) is new director of Armed Forces Institute of Pathology, succeeding Capt. William M. Silliphant, M.C., U.S. Navy.

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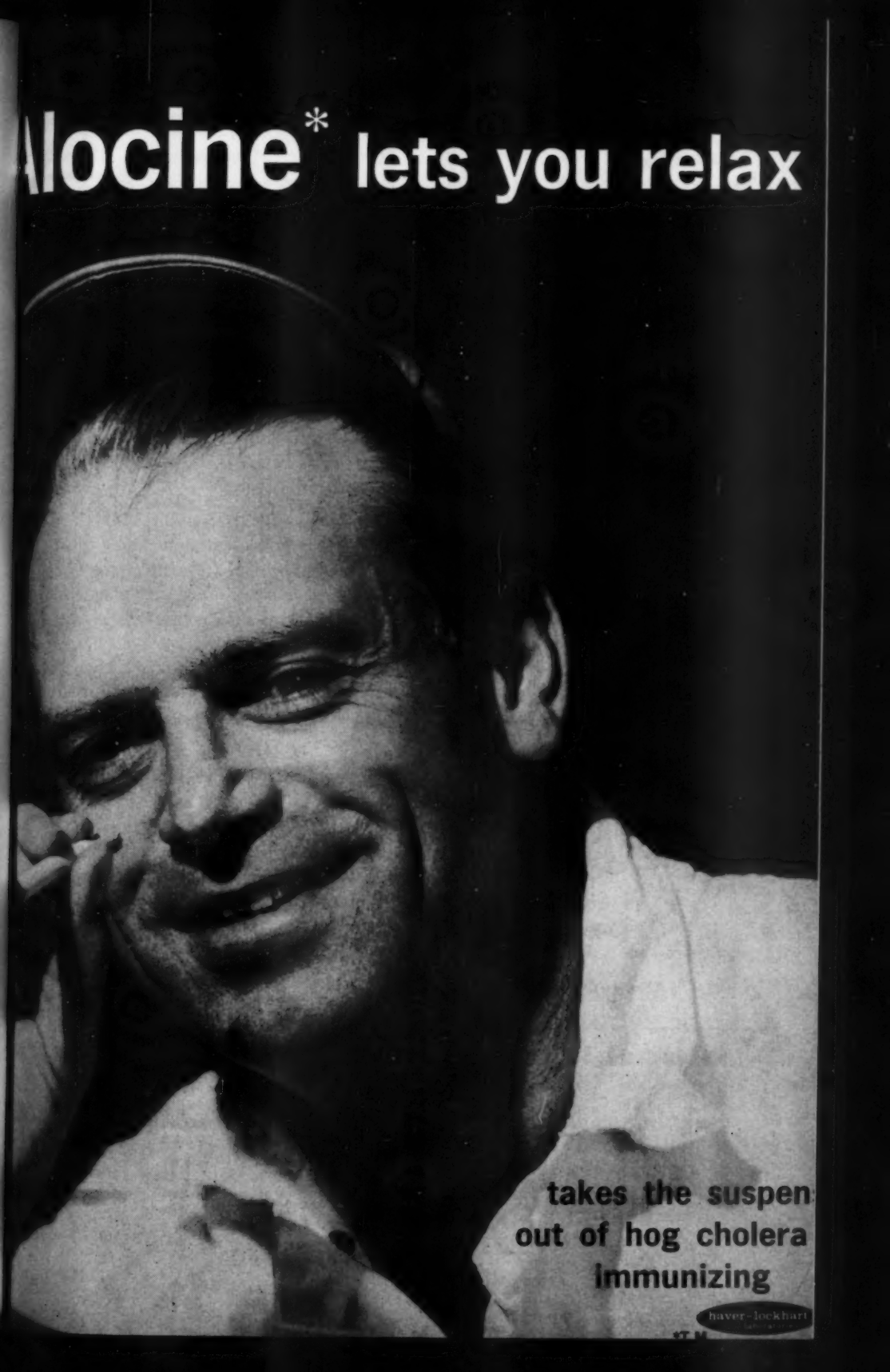
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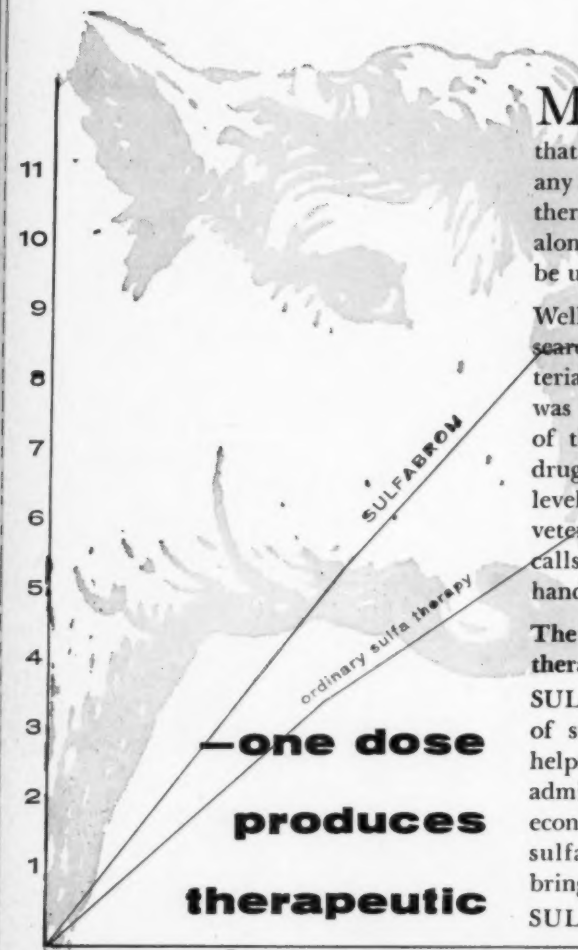

More than any other professional man, the practicing veterinarian knows that his most valuable asset is time. In any area of his practice, the success of his therapy cannot be measured by results alone; he is a busy man whose time must be used judiciously.

Well aware of this problem, Merck research workers have designed an antibacterial agent which, from its conception, was meant to satisfy the particular needs of the veterinarian. In cattle, this new drug produces effective therapeutic blood levels for at least two days, freeing the veterinarian from time-consuming return calls and minimizing stress-producing handling.

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pneumonia "in five days' time this calf was back to normal";[1]
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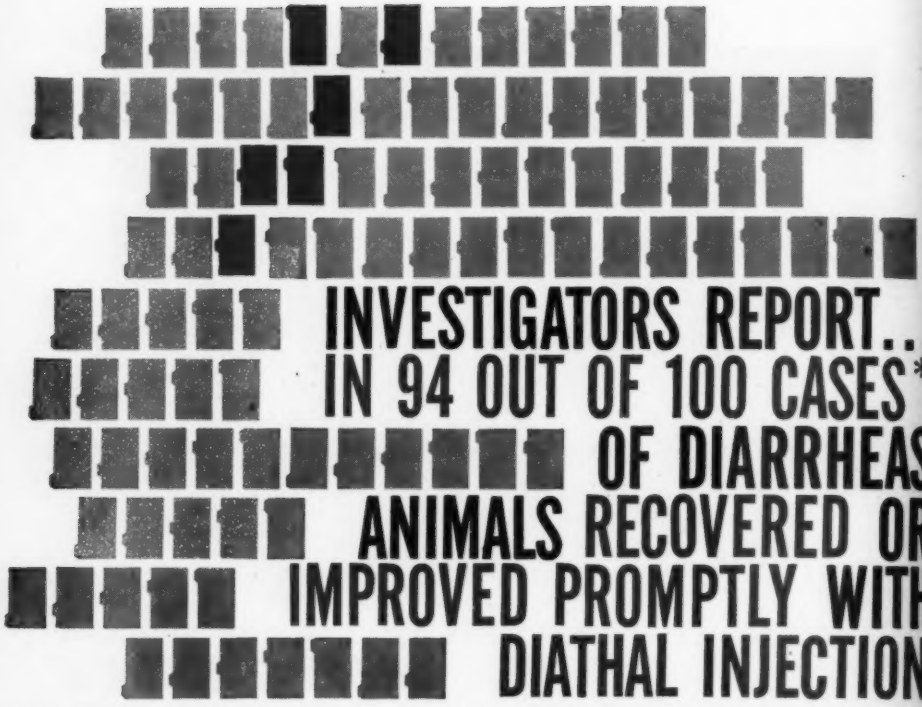

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Oral Treatment of Spontaneous Ringworm in Cats with Griseofulvin

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Atlanta, Georgia

IN THE PAST, the approach to the therapy of ringworm in animals, as well as man, has been to develop and employ topical medications. Over the years a large number of such remedies have been made available for clinical use; however, none have proved satisfactory.[8] This therapeutic failure does not reflect inability on the part of the numerous preparations to suppress dermatophyte activity, because many of the compounds do possess marked antifungal properties *in vitro*. This failure reflects the inability of the topical remedies to penetrate the keratin of the skin and its appendages and thus reach the invading fungus. Furthermore, it has been found that some topical medicaments are toxic to the patient, particularly when applied to large areas of the body.[11,17] It is apparent that measures currently employed for the treatment of ringworm leave much to be desired.

The inability of the topical medications to meet the need for effective therapy and control of the dermatophytoses suggested to several workers the desirability for a different therapeutic approach.[1,19] In line with this thinking, the recent preliminary report[5] of the successful treatment of experimental *Microsporum canis* and *Trichophyton mentagrophytes* infections in guinea pigs by the oral administration of griseofulvin is of highest significance.

Griseofulvin was first described in 1939[14] as a metabolic product isolated from the mycelium of *Penicillium griseofulvum*. The antifungal properties of this compound were discovered in 1946[3] when a metabolic product ("Curling Factor") produced by *Penicillium janczewskii* was tested. In 1947, it was reported[6] that "Curling Factor" and griseofulvin were identical.

Subsequent studies[4] brought to light the fact that griseofulvin induces stunting, excessive branching, swelling, distortion, and spiral twisting of the hyphae of Basidiomycetes, Ascomycetes, and some Phycomycetes and Deuteromyces. Griseofulvin had no effect on bacteria, actinomycetes, and yeasts. It was postulated that this antibiotic affects the development of the cell wall in fungi that possess chitinous mycelium. Extensive *in vitro* tests were carried out[13] which indicated that griseofulvin was of high potential value in protection of plants against fungal diseases. Subsequent field trials[16] supported these laboratory findings.

In 1958, studies were carried out[5] to determine the systemic effect of griseofulvin on animal ringworm infections. It was found that orally administered griseofulvin at a dosage of 60 mg. per kilogram, when given daily, favorably affected the course of *M. canis* and *T. mentagrophytes* ringworm in experimentally infected guinea pigs. Stimulated by these findings, other workers[10] treated cattle, experimentally infected with *Trichophyton verrucosum*, with griseofulvin. Oral dosages of 60 mg. per kilogram prevented infections or cleared up already established infections. More recently, investigators in Great Britain[18] and the United States[2] reported the successful

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The griseofulvin employed in this study was furnished by Glaxo Laboratories Ltd., Greenford, Middlesex, England, and by Johnson & Johnson, New Brunswick, N.J. It will be marketed in the United States as Fungifuge (Veterinary) by McNeill Laboratories, Philadelphia, Pa., and as Fulvicin by Schering Corp., Bloomfield, N.J.

oral treatment of human ringworm infections with griseofulvin.

It appears from the reports to date that, in mammals, griseofulvin apparently unites with keratogenous cells, rendering newly keratinized tissues and structures refractory to dermatophyte invasion. In addition to this most desirable property, griseofulvin when administered orally to mammals has little toxicity. When given intravenously or intraperitoneally, however, the drug has been shown[15] to produce alterations in mitotic activity, particularly in bone marrow and the seminal epithelium of laboratory animals. Consequently, these routes of introduction should not be employed in therapy.

Ringworm in cats is a common dermatological disorder of public health importance. Studies in this country and other parts of the world have shown that *M. canis* is the principal cause of feline dermatophytosis.[7,9] This fungus is readily transmissible to human contacts, and infected cats constitute a major reservoir of this agent for man. The desirability of controlling *M. canis* infections in cat populations, both from an economic and public health standpoint, is apparent. The achievement of this objective would be greatly facilitated when a reliable therapeutic and prophylactic agent becomes available for these infections. The favorable preliminary reports on the clinical use of griseofulvin in guinea pigs, cattle, and man suggest the possibility that this drug might be advantageously employed in feline ringworm control. Accordingly, it was decided to test this antibiotic in cats, both from a therapeutic and prophylactic standpoint.

The present preliminary report records our experiences over a three-month period in the use of orally administered griseofulvin for the treatment of 22 cats spontaneously infected with *M. canis*.

MATERIALS AND METHODS

Twenty-two cats were included in this preliminary study. Of this number, 20 were purebred Persian cats and 2 were domestic short-hair cats. They ranged in age from 1 month to 4 years; 11 were females and 11 were males (1 male had been altered). All the Persians were maintained by a single breeder whose stock had been infected with *M. canis* for several years. The domestic short-hair cats were the property of two different individuals.

During the course of the study, the animals were kept in individual cages which were provided with newspaper bedding and paper-filled pans for elimination. Nineteen of the Persians were housed in one room; the 2 domestic short-hair and 1 Persian kittens in another room. The pedigreed animals were fed a mixture of ground horsemeat and a commercial meat-type dog food twice each day. The short-hair cats received a commercial fish product and milk once a day.

Prior to the administration of griseofulvin, all animals were carefully examined for the presence of cutaneous abnormalities. In addition, a complete mycological examination was carried out on each cat to establish the presence of a dermatophyte infection. This procedure included Wood's light and direct microscopic examinations as well as cultural studies. Throughout the course of the investigation, Sabouraud's dextrose agar slants to which had been incorporated cycloheximide (0.5 mg./ml.) and chloramphenicol (0.05 mg./ml.) were routinely employed for dermatophyte isolation.

Microsporum canis was recovered from all 22 cats. In this series, 18 animals had clinically detectable lesions which varied from a few missing or broken hairs confined to a single site to heavily crusted patches of alopecia involving large areas of the body. Four cats had no clinical evidence of ringworm. In 15, hairs were observed to fluoresce under the Wood's light. A few such hairs were plucked from each cat and examined under the microscope in 10 per cent KOH mounts to eliminate the possibility of false fluorescence. In each instance, a mosaic of small spores, 2 to 3μ in diameter, was observed to surround the pilar shaft. In the cases where hairs fluoresced, careful study disclosed that the entire extrafollicular portion of the shafts manifested this phenomenon. Four of the 7 Wood's light-negative cats had fungal invasion of hairs or epithelial debris under the microscope, or both.

Griseofulvin was administered orally in single daily doses of approximately 60 mg. (one quarter of a 250-mg. scored tablet) to the cats 3 months old and over, and approximately 40 mg. (one sixth of a 250-mg. tablet) to the 2 1-month-old kittens. The 15 Wood's light-positive cats were given the drug every day until they became clinically normal and their hairs no longer fluoresced under the ultraviolet light. Then

the griseofulvin was given twice a week. The 6 Wood's light-negative cats with cutaneous lesions were given the drug every day until clinically normal. Then the antibiotic was given twice a week. The 1 Wood's light-negative cat with no apparent skin lesions was given the drug every day until culturally negative. Then the drug was administered twice a week.

Animals were regarded as clinically normal when crust and scale formation could not be detected by visual examination and manual palpation, and when areas of alopecia were rapidly being filled in by normal hair. The criterion for a complete mycological recovery was two successive negative cultures taken two weeks apart.

The progress of the disease and response to medication were observed through clinical responses, including possible undesirable side reactions, Wood's light examination, and cultures. Clinically recovered animals that were Wood's light-negative but culturally positive were dipped in a 1:200 solution of 45 per cent technical captan powder (Ortho-Tack-Wash*) or shampooed with napthalene soap (Vermex*) and recultured. Hairs for culture from clinically normal animals were collected by plucking from the head, back, tail, and extremities, as well as from the sites of former cutaneous alterations.

RESULTS

Eight cats (No. 1, 2, 7, 9, 14, 15, 20, and 21) showed a marked favorable response to the medication within one week, and 5 (No. 3, 8, 10, 13, and 19) within two weeks (table 1). At this stage of healing, crust and scale formations started to break up and fall off, with the skin becoming softer and more pliable. These 13 animals had had the most extensive and severe lesions prior to the initiation of griseofulvin therapy.

Within three weeks, 10 of the cats (No. 4, 5, 6, 10, 12, 13, 14, 19, 21, and 22) appeared clinically recovered. At the end of one month, 6 additional cats (No. 1, 2, 7, 9, 15, and 20) were clinically normal. And at the end of five weeks, 2 more animals (No. 3 and 8) reached this stage. In no case did extension of existing lesions or new lesions occur while the cats were under treatment. Figures 1 and 2 show the progress of healing in cat 20, the most severely and extensively affected animal in this series. Under treatment it was observed that a few hairs still fluoresced along their entire length. However, in the majority of Wood's light-positive hairs, fluorescence was confined to the distal end of the shaft. The basal portion of these hairs, when examined under the microscope, was found to be free of fungus. Thus, it became possible to render cats Wood's light-negative by cutting off the fluorescent tips of hairs, leaving the unaffected proximal parts *in situ*.

After three weeks of treatment, it was possible to accomplish this conversion in 8 cats (5, 6, 10, 11, 12, 18, 21, and 22). In the case of cats 21 and 22, however, it was decided not to clip the fluorescent portions at that time. After 11 weeks of treatment, the tips of hairs of these 2 cats still fluoresced under the Wood's light, at which time they were cut off. Other cats rendered negative to the Wood's light were: cat 1, after one month; cat 3, after five weeks; cat 9, after six weeks; cats 8 and 16, after 12 weeks of treatment.

In 2 cases (animals 13 and 20), some hairs continued to fluoresce along their entire lengths after 12 weeks of therapy. It could have been possible to convert these 2 cats to a Wood's light-negative state by epilating the affected hairs. It was observed during the course of treatment that in nearly all the Wood's light-positive cats varying numbers of fluorescent hairs had fallen out or broken off spontaneously. However, in no case during the three months did a complete conversion to a negative state occur spontaneously.

Although griseofulvin demonstrated a marked capacity to bring about a rapid clinical recovery, it was not as effective in producing a mycological recovery. As noted in table 1, only 8 cats (1, 3, 4, 7, 11, 14, 15, and 19) were rendered culturally negative through use of this drug alone. It was still possible to isolate *M. canis* from 13 cats after two months of therapy. (Kitten 5 was sold after four weeks of antibiotic therapy. It was shampooed prior to sale; however, specimens were not taken for culture after the topical therapy.) Whether these recoveries indicated persistence of active infection or merely passive contamination of the skin and hair could not be determined.

*Ortho-Tack-Wash is manufactured by the California Spray Chemical Corporation, Richmond, Calif.; Vermex by the Vermex Company of America, Burbank, Calif. The use of trade names is for the purpose of identification, and does not constitute endorsement by the U. S. Public Health Service.

TABLE I—Response of Cats Infected with Microsporum canis to the Oral Administration of Griseofulvin

Identification No.	Breed	Age	Sex	Clinical history prior to therapy	Mycological findings prior to therapy: Wood's light	Direct microscopic examination	Culture	Therapeutic results
1	Persian	9 mo.	M	Multiple large crusted patches of alopecia over entire body; skin lesions of varying degrees of severity present since two weeks after birth.	+	+	+	Within 1 week marked clinical improvement evident; after 1 month animal clinically normal. Wood's light-positive hairs fluoresced at their distal portions; affected portions were cut off; seven weeks after griseofulvin therapy was initiated, cultures negative without supplementary treatment; after nine weeks cultures still negative.
2	Persian	16 mo.	F	Numerous small crusted lesions present over entire body; condition present for several months.	−	+	+	Within 1 week marked clinical improvement evident; after 1 month animal clinically normal; 7 weeks after treatment was initiated cultures still positive. Animal dipped in the captan solution; post-dip cultures taken 2 weeks apart were still positive.
3	Persian	3½ yr.	F	Circular, scaly areas of alopecia on neck, ear, and tail; lesions present for six weeks.	+	+	+	Within 2 weeks marked clinical improvement evident; after 5 weeks animal clinically normal; all Wood's light-positive hairs fluoresced at tips; affected tips cut off; after 7 weeks cultures negative without supplementary treatment; after 9 weeks cultures still negative.
4	Persian	4 yr.	F	Few missing hairs on both ears; duration of condition unknown.	−	−	+	After 3 weeks animal clinically normal; after 7 weeks cultures negative without supplementary treatment; after 9 weeks cultures still negative.
5	Persian	1 mo.	M	Hair loss on legs, feet, and chest; lesions present for two weeks.	+	+	+	After 3 weeks animal clinically normal; at this time Wood's light-positive hairs fluoresced at their distal portions; affected portions cut off; animal shampooed and sold; no post-shampooing cultures were prepared.
6	Persian	1 mo.	M	Few missing hairs on face, paws, and eyelids.	+	+	+	After 3 weeks animal clinically normal; at this time all Wood's light-positive hairs fluoresced at their distal portions; affected portions cut off; after 4 weeks animal given two shampoos, one week apart; cultures prepared after shampooing negative; animal sold after 5 weeks.
7	Persian	12 yr.	M	Numerous small crusted areas of alopecia on back, neck, and face; lesions present for several months.	−	+	+	Within 1 week, clinical improvement evident; after 1 month animal clinically normal with exception of a few small crusted areas on neck; after 7 weeks cultures negative without supplementary treatment; after 9 weeks cultures still negative.
8	Persian	1 yr.	M	Numerous small scaly areas with some hair loss on ears, flanks, shoulders, and tail; skin lesions present since two weeks after birth.	+	+	+	After 2 weeks clinical improvement evident; after 3 weeks cat developed a general pruritus which persisted for 3 days; after 5 weeks animal clinically normal; at this time most of the Wood's light-positive hairs fluoresced at distal portions; affected fluorescent hairs still evident; animal dipped in the captan solution; animal still Wood's light-positive and culturally positive; after 12 weeks remaining Wood's light-positive hairs fluoresced at tips; cultures still positive.

TABLE 1 (continued)—Response of Cats Infected with Microsporum canis to the Oral Administration of Griseofulvin

Identification No.	Age	Sex	Clinical history prior to therapy	Mycological findings prior to therapy: Wood's light	Direct microscopic examination	Culture	Therapeutic results
9	Persian	6 mo. F	Multiple crusted patches of alopecia on back and shoulders; skin lesions had been present for 4 months.	+	+	+	Within 1 week clinical improvement evident; after 1 month animal clinically normal; after 6 weeks all Wood's light-positive hairs fluoresced at tips; affected portions cut off; after 8 weeks cultures still positive. Animal dipped and washed in captan solution; two sets of cultures prepared two weeks apart after dipping negative.
10	Persian	3 yr. F	Multiple crusted areas of alopecia on neck and shoulders; lesions were 1 month old.	+	+	+	After 2 weeks clinical improvement evident; after 3 weeks animal clinically normal; at this time all Wood's light-positive hairs fluoresced at their distal portions; affected portions cut off; after 7 weeks cultures still positive; cat dipped in captan solution; two sets of cultures prepared two weeks apart after dipping negative.
11	Persian	7 mo. M	No apparent clinical lesions visible; under the Wood's light patches of fluorescing hairs on face and axillae; no history of duration of infection.	+	+	+	After 3 weeks all Wood's light-positive hairs fluoresced at tips; affected portions cut off; after 6 weeks cultures negative without supplementary treatment; after 8 weeks cultures still negative.
12	Persian	6 mo. F	Several scaly areas with some hair loss on abdomen and head; lesions were 1 month old.	+	+	+	After 3 weeks animal clinically normal; all Wood's light-positive hairs fluoresced at tips; affected portions cut off; after 6 weeks cultures still positive; animal dipped and washed in captan solution; two sets of cultures prepared 2 weeks apart after dipping negative.
13	Persian	11 mo. M	Numerous scaly areas with some hair loss on the head, shoulders, and flank; lesions had been present for 10 months.	+	+	+	After 2 weeks clinical improvement evident; after 3 weeks animal appeared clinically normal; at this time many Wood's light-positive hairs fluoresced at tips; after 8 weeks a number of Wood's light-positive hairs still fluoresced along entire lengths; after 12 weeks few Wood's light-positive hairs still evident; cultures still positive.
14	Persian	2 yr. M	Several small crusted areas on face and neck; duration of lesions unknown.	−	−	+	Within 1 week clinical response evident; after 3 weeks animal clinically normal; after 1 month cultures negative; after 6 weeks cultures still negative.
15	Persian	9 mo. F	Multiple small crusted areas on head, tail, and back; lesions had been present for several months.	−	+	+	After 1 week clinical response evident; after 1 month animal appeared clinically normal with exception of a few minute crusted spots on tail; after 5 weeks animal was culturally negative without any supplementary treatment; after 7 weeks culture still negative.
16	Persian	7 mo. M	No visible lesions evident; under the Wood's light patches of fluorescent hairs over entire back and tail; condition had been present for 6 weeks.	+	+	+	After 2 weeks many Wood's light-positive hairs fluoresced at distal portions; affected portions clipped; after 8 weeks a few Wood's light-positive hairs that fluoresced along entire length still present. Animal dipped in captan solution; cultures prepared after dipping still positive; after 10 weeks cultures still positive; after 12 weeks a few hairs fluoresced at tips; affected portions cut off; cultures at this time still positive.

(Table 1 continued on page 258)

TABLE I (continued)—Response of Cats Infected with Microsporum canis to the Oral Administration of Griseofulvin

Identification No.	Age	Sex	Clinical history prior to therapy	Mycological findings prior to therapy: Wood's light	Direct microscopic examination	Culture	Therapeutic results
17	Persian 2 yr.	F	No visible lesions evident; no past history of skin lesions.	−	−	+	After 6 weeks cultures still positive. Animal dipped in captan solution; cultures prepared after dipping negative; after 8 weeks animal still culturally negative.
18	Persian 18 mo.	F	No clinical lesions evident; under the Wood's light patches of fluorescent hairs were vitible on the flank and tail.	+	+	+	After 3 weeks all Wood's light-positive hairs fluoresced at tips; affected portions cut off; after 5 weeks cultures still positive; animal dipped and washed in the captan solution; cultures prepared after dipping still positive; after 7 weeks cultures still positive.
19	Persian 14 mo.	F	A single crusted area at the base of the ear; history of skin lesions could not be obtained.	−	+	+	After 2 weeks the lesion showed marked clinical improvement; after 3 weeks animal appeared clinically normal; after 6 weeks cultures negative without supplementary treatment; after 8 weeks cultures still negative.
20	Persian 3 mo.	F	Massive confluent, heavily crusted areas of alopecia over entire body; lesions had been present since 2 weeks after birth.	+	+	+	Dramatic clinical improvement evident within 1 week; after 1 month animal appeared clinically normal; at this time many Wood's light-positive hairs fluoresced at distal portions; affected portions clipped; after 3 months a number of hairs still fluoresced along entire lengths. Animal dipped and washed in captan solution; cultures prepared after dipping still positive.
21	Domestic Short-Hair 2 yr.	M alt.	A single heavily crusted circular area of alopecia on neck; lesion was approximately 1 week old.	+	+	+	After 1 week clinical improvement evident; after 3 weeks animal clinically normal; all Wood's light-positive hairs fluoresced at tips; affected portions allowed to remain in situ; after 11 weeks Wood's light-positive hairs fluoresced at tips; affected portions cut off; after 11 weeks cultures still positive and animal shampooed; cultures prepared after shampooing negative; after 13 weeks cultures still negative.
22	Domestic Short-Hair 7 mo.	M	A few missing or broken hairs evident on upper lip and side of the nose; under the Wood's light numerous fluorescent hairs were visible; duration of the lesions not known.	+	+	+	After 3 weeks Wood's light-positive hairs fluoresced at distal portions; hairs were allowed to remain in situ; at this time animal appeared clinically normal. after 11 weeks only a single hair fluoresced at its tip; affected portion cut off; after 11 weeks cultures still positive and animal was shampooed; cultures prepared after shampooing negative; cultures prepared after 13 weeks still negative.

To expedite the conversion to a culturally negative state it was considered advisable to apply topical therapy. Accordingly, 9 cats were dipped in the captan solution and 3 were shampooed with the naphthalene soap. Specimens were then taken and cultured the same day and two weeks later. After one immersion in the dip, 4 cats (9, 10, 12, and 17) became culturally negative; 5, however, still yielded *M. canis* on culture. The 3 that were given the shampoo treatment were rendered free of the infection. One cat (13) had not received topical therapy and still yielded *M. canis* after three months of griseofulvin treatment.

During the course of griseofulvin therapy, only 1 cat developed a possible side reaction. This animal (8) evinced a general pruritus after three weeks of treatment. The itching disappeared spontaneously in three days without interruption of griseofulvin administration. Consequently, the

possible relationship of this episode to the antibiotic intake could not be established. No side effects were observed in the remaining 21 cats. On the contrary, a noticeable improvement in the general health and well being of the more extensively infected animals was observed. It was noted that although griseofulvin tastes bitter to man, the cats at all times readily accepted the drug, making administration simple.

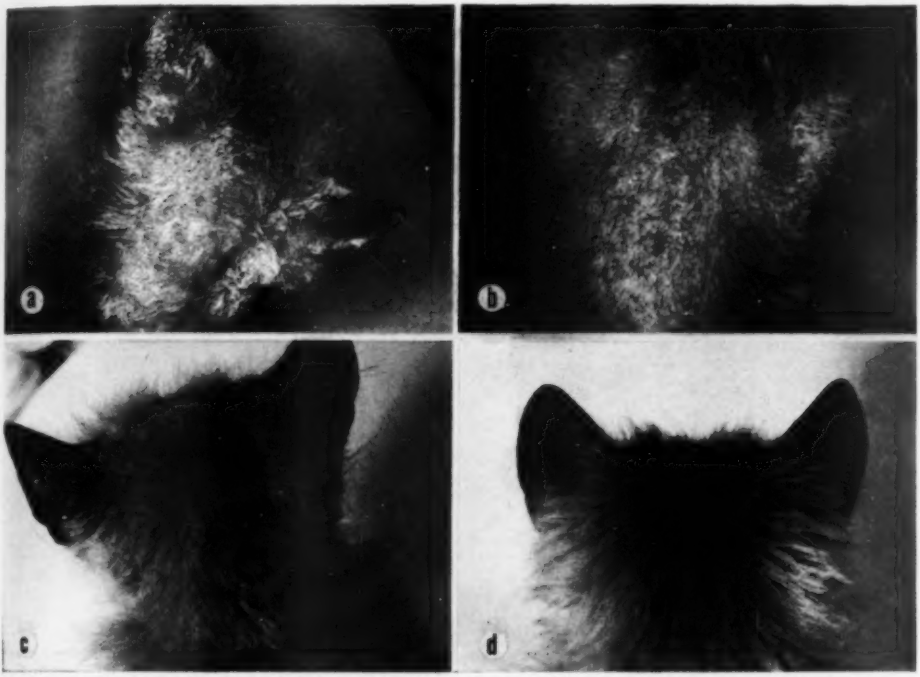

Fig. 1—Progress of healing of lesions on head of a 3-month-old purebred Persian kitten: (a) clinical picture prior to griseofulvin therapy, showing heavy crust formation and alopecia; (b) after four days of griseofulvin therapy, the heavy crusts have started to break up and fall off; (c) after two weeks of griseofulvin therapy, crust formation is not evident and hair is growing rapidly; (d) after one month of griseofulvin therapy, animal appears clinically normal.

DISCUSSION

The results of this study, though preliminary in nature, point to the marked curative powers of griseofulvin for *M. canis*-induced ringworm in cats. Although some of the animals in this series had been suffering from this disorder for many months, clinical recovery was achieved within five weeks. Furthermore, some evidence has been obtained which might indicate that the antibiotic does offer protection against the development of new lesions. The possible possession of such prophylactic powers is further suggested by the results of our preliminary studies[12] with guinea pigs. It was found possible to completely protect these laboratory animals against experimental *M. canis* infection through a daily course of treatment with griseofulvin starting four days prior to challenge. Such desirable properties, together with ease of administration and low toxicity would make griseofulvin the drug preferred for management of ringworm in cats.

Its principal limitation, however, lies in the inability to regularly eradicate the infectious agent from the body surface within a reasonably brief period of time. To facilitate the achievement of this ultimate goal, supplemental therapy in the form of dips or shampoos might be advantageously employed. The possibility exists that griseofulvin therapy extended

over many months might eliminate the necessity of any other form of therapy. This possibility remains to be investigated. Also, further studies need to be carried out to ascertain the optimum dosage of this drug for cats. Such studies are now in progress and findings to date in 8 cats would indicate that a daily dose of 50 mg. for one week, followed by a treatment once a week, is effective in bringing about a clinical recovery.

The demonstrated efficacy of griseofulvin used for treatment of feline ringworm suggests the possibility that this oral

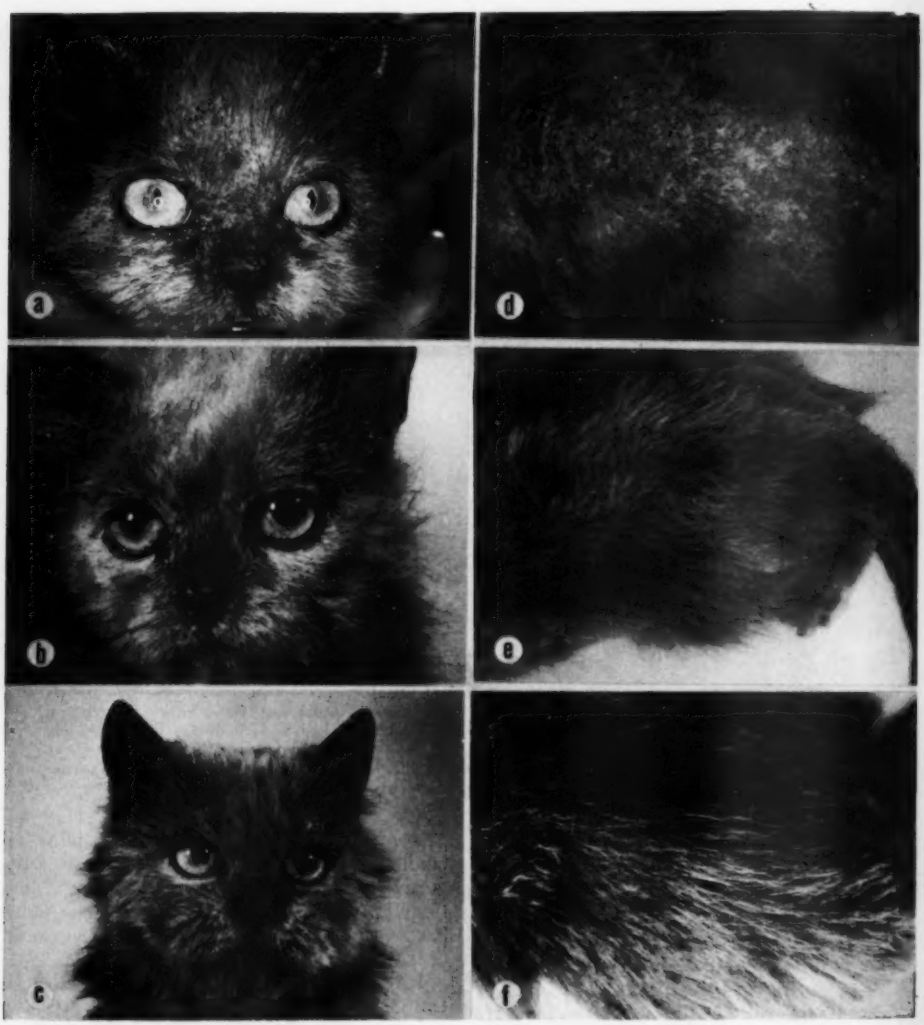

Fig. 2—Progress of healing of lesions on face and back of a 3-month-old purebred Persian kitten: (a) appearance of lesions on face prior to griseofulvin therapy; heavy crust formation and loss of hair are evident; (b) after two weeks of griseofulvin therapy, crust formation is not evident and hair is growing rapidly; (c) appearance of face after one month of griseofulvin therapy; (d) lesions on back and base of tail prior to griseofulvin therapy—heavy crust formation and alopecia are evident; (e) lesions on back and base of tail after two weeks of griseofulvin therapy—crust formation is not evident and hair is growing rapidly; (f) after one month of griseofulvin therapy, animal appears clinically normal.

antibiotic could be a most useful tool in the control of the common *M. canis* infections in cat-breeding and sales establishments. Such studies, which are both of public health and economic interest, are currently in progress. It should be pointed out, however, that successful control consists in the complete eradication of the organisms from cutaneous surfaces rather than the mere elimination of clinical signs. A less vigorous definition of control would give a false sense of security.

SUMMARY

Twenty-two cats with *Microsporum canis* ringworm were treated with orally administered griseofulvin. Of the 18 animals that showed visible lesions prior to therapy, 10 were clinically normal within three weeks, 6 at the end of one month, and 2 at the end of five weeks. During the course of the study, 8 cats were rendered culturally negative through the use of this drug alone.

The toxicity of griseofulvin for cats appears to be low. Of the 22 cats, only 1 developed a possible side reaction. This animal had a generalized pruritus after three weeks of daily therapy which disappeared spontaneously in three days without interruption of treatment.

As evidenced by these preliminary findings, griseofulvin possesses many desirable properties for the control of ringworm in cat-breeding and sales establishments.

References

[1]Alkiewicz, J., Eckstein, Z., Halweg, H., Krakowka, P., and Urbanski, T.: Fungistatic Activity of Some Hydroxamic Acids. Nature, *180*, (1957): 1204-1205.

[2]Blank, H., and Roth, J. F.: The Treatment of Dermatomycoses with Orally Administered Griseofulvin. Arch. Dermat., *79*, (1959): 259-266.

[3]Brian, P. W., Curtis, P. J., and Hemming, H. G.: A Substance Causing Abnormal Development of Fungal Hyphae Produced by *Penicillium janczweskii* Zal. I Biological Assay, Production and Isolation of "Curling Factor." Tr. Brit. Mycological Soc., *29*, (1946): 173- 187.

[4]Brian, P. W.: Studies on the Biological Activity of Griseofulvin. Ann. Botany, *13*, (1949): 59-78.

[5]Gentles, J. C.: Experimental Ringworm in Guinea Pigs: Oral Treatment with Griseofulvin. Nature, *182*, (1958): 476-477.

[6]Grove, J. F., and McGowan, J. C.: Identity of Griseofulvin and "Curling Factor." Nature, *160*, (1947): 574.

[7]Kaplan, W., Georg, L. K., and Ajello, L.: Recent Developments in Animal Ringworm and Their Public Health Implications. Ann. New York Acad. Sci., *70*, (1958): 636-649.

[8]Kligman, A. M., and Anderson, W. W.: Evaluation of Current Methods for the Local Treatment of Tinea Capitis. J. Invest. Dermat., *16*, (1951): 155-166.

[9]La Touche, C. J.: The Importance of the Animal Reservoir of Infection in the Epidemiology of Animal-Type Ringworm in Man. Vet. Rec., *67*, (1955): 666-667.

[10]Lauder, I. M., and O'Sullivan, J. G.: Ringworm in Cattle. Prevention and Treatment with Griseofulvin. Vet. Rec., *70*, (1958): 949-951.

[11]Menges, R. W., Georg, L. K., and Habermann, R. T.: Therapeutic Studies on Ringworm-Infected Guinea Pigs. J. Invest. Dermat., *28*, (1957): 233-237.

[12]Mycology Unit, Communicable Disease Center, Chamblee, Ga.: Unpublished data, 1958.

[13]Napier, E. J., Turner, D. I., and Rhodes, A.: The *in Vitro* Action of Griseofulvin Against Pathogenic Fungi of Plants. Ann. Botany, *20*, (1956): 461-466.

[14]Oxford, A. E., Raistrick, H., and Simonart, P.: XXIX. Studies in the Biochemistry of Micro-organisms. LX. Griseofulvin, $C_{17}H_{17}O_6Cl$, a Metabolic Product of *Penicillium griseofulvum* Dierchx. Biochem. J., *33*, (1939): 240-248.

[15]Paget, G. E., and Walpole, A. L.: Some Cytological Effects of Griseofulvin. Nature, *182*, (1958): 1320-1321.

[16]Rhodes, A., Crosse, R., McWilliam, R., Tootill, J. P. R., and Dunn, A. T.: Small-Plot Trials of Griseofulvin as a Fungicide. Ann. App. Biol., *45*, (1957): 215-226.

[17]Wallach, E. A.: Convulsions Following Treatment of Tinea Capitis with Asterol Dihydrochloride Ointment. Arch. Dermat. and Syph., *67*, (1953): 517-518.

[18]Williams, D. I., Marten, R. H., and Sarkany, I.: Oral Treatment of Ringworm with Griseofulvin. Lancet (Dec. 6, 1958): 1212-1213.

[19]Wilson, J. W.: Possible Approaches to the Therapy of Fungus Diseases. Therapy of Fungus Diseases. Little, Brown and Company, Boston (1955): 25-30.

The Treatment of Dermatomycoses with Griseofulvin

Although infections caused by *Candida albicans*, *Malassezia furfur*, and *Blastomyces dermatitidis* do not seem to respond to griseofulvin given orally, mycoses caused by various other species of dermatophytes show uniformly favorable response.

Cultures of epithelial lesions often become negative in one week. Direct KOH examinations may be positive for an additional week or more.

Infected nails and hair appear to contain viable fungi until the involved portions are replaced by healthy new growth.

Although toxic reactions appear to be minimal in therapeutic doses in man, the animal data indicate that repeated peripheral blood cell counts should be performed during prolonged therapy.

A daily dose of 1.0 Gm. for man seems

to be adequate, although the minimum effective dose and the optimum dose have not been established for all types of infection.

The duration of treatment required probably will vary, apparently depending on the time required for normal replacement of the infected tissues.—*Am.M.A. Arch. Dermat. (March, 1959): 259.*

Oral Treatment of Ringworm

Guinea pigs experimentally infected with *Microsporum canis* and *Trichophyton mentagrophytes* responded quickly to small oral doses of the antibiotic griseofulvin. It is evidently absorbed and secreted into the dermis; it was found in the hair of treated animals. In man, oral doses of 0.5 Gm. four times a day without local treatment resulted in rapid relief of itching, loss of hyperkeratosis, and disappearance of the fungi. In ringworm of the scalp, the hair did not fluoresce under Wood's light three weeks after the first treatment. No side-effects were observed.—*J.Am.M.A. (March 7, 1959): 1110.*

Report on Zoonoses

The following items are from *Morbidity and Mortality,* weekly reports issued by the U.S. Department of Health, Education, and Welfare.

Rabies in Animals.—A fox was found lying on a bed when the owner of the house, in Minnesota, returned home. It had apparently entered through a basement window and had torn down the curtains, leaving the place in shambles. It was shot and tests proved it to be rabid.—*April 3, 1959.*

A fox entered a house in Arkansas and, when chased out, it climbed the screen door and clung there. It was killed while clinging to the screen. It proved to be rabid.—*April 10, 1959.*

• • •

Rabies in Man.—The first case of human rabies in 1959 was reported from Alabama. In late February, a woman was given a pup which later seemed to become rough and bit one adult and two children. Rather than keep the dog confined for ten days, as advised by the health department, it was taken out on the highway and released. The woman who was bitten developed rabies on May 25 and died on June 8. Tests were positive for rabies.

A man in California who had been exposed to bats in Mexico and Texas died in June from rabies. This was confirmed by animal inoculation.—*June 12 and 26, 1959.*

• • •

Trichinosis.—Seven persons in Philadelphia developed trichinosis within ten days after ingestion of a common meal which supposedly consisted of ground lamb into which was pounded raw wheat kernels. It was eaten raw. The "leg of lamb" was ground twice in a grinder also used for other meats, and could have contained some contaminated pork.

Trichinosis also developed in a man and wife, in Pennsylvania, who had eaten home-raised pork two weeks previously. The infection was mild and both were released from the hospital in a week.—*April 10, 1959.*

Four persons in New York City developed trichinosis, in a period of 18 days, beginning three weeks after they had eaten sausages made from uninspected pork which had been smoked for three days but not cooked. Viable Trichina were found in a sample of ham from the same source.—*April 24, 1959.*

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Chemical Food Poisoning.—Sixteen members of three families in Ohio became ill ten to 20 minutes after eating ground beef to which a substance had been added to preserve the red color. The meat was eaten either as meat loaf or chop suey. Three samples of the substance contained 11.7 to 14.2 per cen niacin and 6.2 to 7.1 per cent ascorbic acid.—*May 22, 1959.*

Human Anthrax in the United States in 1958

During 1958, 16 cases of human anthrax were reported: 7 in Arkansas, 4 in Pennsylvania, 2 each in Massachusetts and Louisiana, and 1 in Mississippi.—*Anim. Morbidity Rep., June 2, 1959.*

Facial Actinomycosis in Man

A machinist, who could barely open his mouth and was believed to have tetanus, was given large doses of penicillin daily for six days. He apparently recovered, but the condition recurred several months later; this time with a swelling in a mas-

seter muscle. It was opened surgically, an encapsulated area of necrotic debris was removed by curette, the area was packed with a mycostat, and a course of potassium iodide was given. The incision healed promptly without any subsequent drainage.—*Illinois Med. J. (May, 1959): 271.*

Tularemia in Ontario

Two Indians on a reservation developed tularemia. Seven other cases were suspected but not confirmed. *Pasteurella tularensis* was isolated from dead muskrats and from mud and water in the area.—*Canad. J. Comp. Med. & Vet. Sci. (May, 1959): 153.*

Systemic Candidiasis in Man

A case of systemic *Candida tropicalis* infection (moniliasis) which caused the death of a woman who had suffered from chronic dyspepsia and chronic rheumatoid arthritis is described. In her last week of life, she developed uremia with coma and twitchings. On necropsy, there were no obvious mycotic lesions in the mucosa of the alimentary or respiratory tracts, but the kidneys were twice their normal size, and numerous yellow abscesses about 1 mm. in diameter were present. The heart was dilated and there were yellowish gray vegetations on the endocardium.

Mucocutaneous candidiasis is a well recognized complication of severe debilitating illness, but has become more common with the widespread use of antibiotics. Systemic candidiasis, a grave disease, can be manifested as a generalized mucocutaneous eruption, as bronchopulmonary inflammation, or as a septicemia. Isolated sites of infection may occur in the kidneys, meninges, or in bones.—*Brit. Med. J. (April 11, 1959): 944.*

Atherosclerosis and Blood Cholesterol

Atherosclerosis, the forerunner of 97 per cent of the cases of coronary heart disease in man, is no longer solely a disease of the aged. Necropsy studies on persons with an average age of 22 years showed atherosclerosis to be present in 77 per cent. While the exact relationship between hypercholesteremia, atherosclerosis, and coronary heart disease still remains to be determined, evidence is steadily accumulating on the desirability of reducing cholesterol levels in those patients where they are elevated.

In a nine-month study of more than 300 persons in a state institution, it was found that when a corn oil margarine (Emdee, Pitman-Moore) rich in essential unsaturated fatty acids was substituted for other solid fats as the principal dietary alteration, it was effective in achieving and maintaining a reduction in blood cholesterol level.—*J.Am.M.A. (May 16, 1959): 257.*

Systemic Effects of Prolonged Use of Corticosteroids in Man

The foremost problems of prolonged use of adrenal steroids appear to be (*a*) atrophy and suppression of the adrenal and pituitary glands; (*b*) production or exaggeration of diabetes mellitus; (*c*) possibility of producing peptic ulcer; (*d*) tendency to produce osteoporosis; (*e*) some tendency to produce psychological or emotional disturbances, and (*f*) possibility of producing arteritis and collagen diseases.

An obviously wise policy is to keep doses of corticosteroids as small as possible for effectiveness, even allowing incomplete control of the basic disease if necessary, and to keep duration of administration at a minimum.—*J. Tennessee State M. A. (Oct., 1958): 395.*

Nalorphine in the Prevention of Narcotic Deaths in Man

The efficacy of N-allylnormorphine (Nalline, Merck, Sharpe & Dohme) in combating narcotic-induced respiratory depression frequently makes it a life-saving drug in cases of overnarcotization. Nalorphine has the capacity to reverse the respiratory depression induced by all natural or synthetic narcotics. It reverses the smooth muscle spasm induced by morphine during labor.

Morphine or other narcotics should not be administered to any patient unless nalorphine is at hand; immediate intravenous administration of 5 to 10 mg. could save the lives of many patients who might otherwise be lost.—*New York State J. Med. (March 15, 1950): 1031.*

Radiographic Anatomy of the Canine Pectoral Limb. Part I. Fully Developed Limb

W. C. D. HARE, B.Sc., Ph.D., M.R.C.V.S.

Philadelphia, Pennsylvania

WHEN INTERPRETING roentgenograms, the veterinary practitioner is somewhat handicapped by the scarcity of reference works. This paper is an endeavor to show by means of labelled tracings some of the anatomic features that can be seen in roentgenograms of the bones of the canine pectoral limb. In Part I, the fully developed limb is presented; in Part II, the developing limb will be considered. The terminology adopted is that used by Miller.[1]

From the School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

[1]Miller, M. E.: Guide to the Dissection of the Dog. 3rd ed. Published by the author, Ithaca, N.Y., 1953.

Fig. 1—Mediolateral view of the right shoulder of a 9-month-old female German Shepherd Dog.

Fig. 2—Labelled tracing of figure 1.

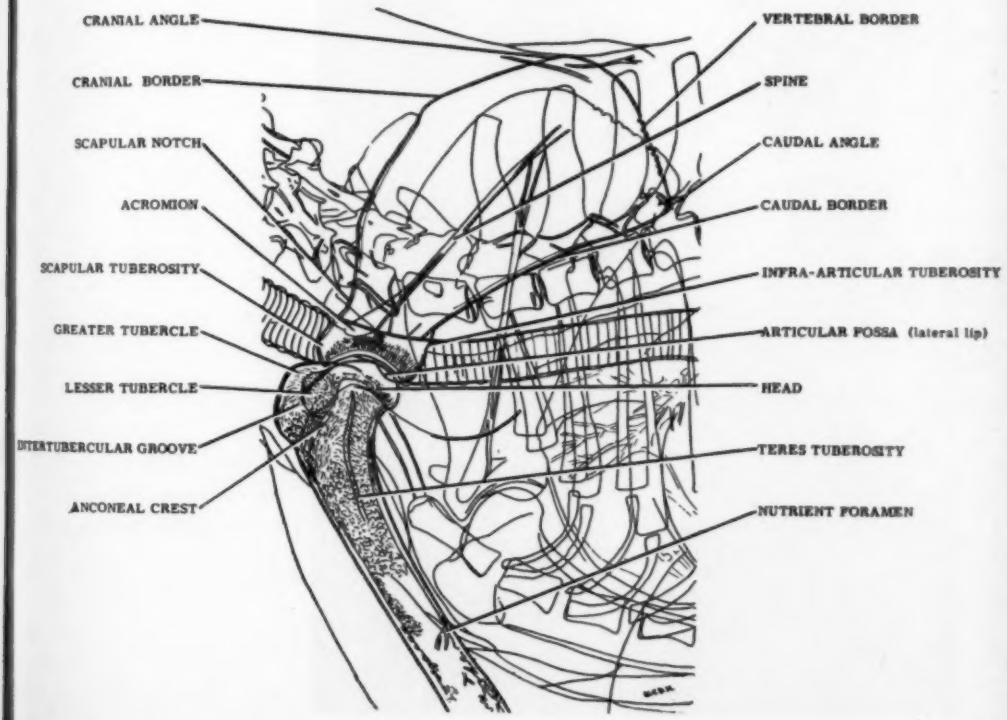
POSITIONING AND TECHNIQUE

The dogs were anesthetized with barbiturates and positioned as will be described. The positions were not necessarily ideal, since the films illustrated were taken as part of a general survey in which economy was a factor and, therefore, some of the exposures had to cover a wider field than would normally be required. A focal-film distance of 36 inches was used, and the central ray was perpendicular to the film in all the exposures presented.

The mediolateral view of the shoulder (fig. 1) was obtained by positioning the dog on its side. The upper forelimb was drawn fully caudad so that it would not obscure the view of the lower limb. The latter was positioned so that the scapulohumeral joint would be situated cranial to the first rib and under the trachea, thereby giving a relatively unobscured view of the joint. Par-speed screens and regular film were used with a Potter-Bucky diaphragm. The central ray was directed to a point just ventral to the caudal angle of the scapula.

The ventrodorsal view of the shoulder (fig. 3) was obtained by positioning the dog on its back with the sternum directly over the thoracic vertebrae. The forelimbs were drawn fully craniad alongside the neck and head. Par-speed screens and regular film were used with a Potter-Bucky diaphragm. The central ray was directed to the fifth or sixth sternebra. In this position, the longitudinal axis of the scapula, represented by the spine, is approximately horizontal and, due to the curvature of the ribs, the scapula is rotated about its longitudinal axis so that the caudal border lies slightly lateral to the cranial. The longitudinal axis of the humerus forms an angle of 110 degrees with the horizontal so that the bone appears shortened.

The mediolateral views of the limb (fig. 5, 9) were obtained by laying the dog on the same side as the limb to be radiographed. Non-screen film was used. The central ray was directed to the middle of



the radius and ulna. In this position, the limb is supinated slightly; consequently, in the view of the paw, a part of the dorsal and volar surfaces can be seen.

The dorsovolar views of the limb (fig. 7, 11) were obtained by first placing the dog on its sternum. Then the limb to be radiographed was grasped by the arm and laid flat on the film by pronating it slightly. The humero-radial-ulnar joint was extended by applying digital pressure to the long head of the triceps brachii muscle. Non-screen film was used. The central ray was directed to the middle of the radius and ulna.

COMMENTARY

All roentgenograms reproduced in this paper were taken of straight-limbed animals. No attempt has been made to

Fig. 3—Ventrodorsal view of the right shoulder of an 11-month-old male German Shepherd Dog.

Fig. 4—Labelled tracing of figure 3.

present films of achondroplastic limbs since the degree to which this condition is expressed can vary quite markedly. The illustrations are more or less self-explanatory, but it is perhaps worthwhile to draw attention to the following points.

In the mediolateral view of the shoulder (fig. 1, 2), it can be seen that the vertebral border of the scapula has a serrated appearance. This is due to the attachment of the bandlike scapular cartilage to this border. The proximal epiphysis of the humerus has not completely united with the diaphysis and evidence of the epiphyseal cartilage can still be seen.

In the mediolateral view of the humero-radial-ulnar joint (fig. 5, 6), it can be seen that, although the joint is partly flexed, the anconal process of the ulna is still situated between the medial and lateral supracondylar ridges of the humerus. This illustrates that the joint should be fully flexed prior to reducing a dislocation of the humero-radial-ulnar joint.

In the mediolateral view of the paw (fig. 9, 10), it can be observed that at each metacarpophalangeal joint, except that of the first digit, there are one dorsal and two volar osseous sesamoids. The first digit has a dorsal sesamoid, although this is frequently absent and, as is usual, it has only one volar sesamoid. The extensor tubercle on the distal phalanx denotes the point of insertion of the extensor digitorum communis and lateralis muscles.

In the dorsovolar view of the paw (fig. 11, 12), the phacoid bone can be seen. This is a sesamoid bone lying in the tendon of the abductor pollicis longus muscle and should not be mistaken for a chip fracture. The medial and lateral tubercles on the middle phalanges mark the point of insertion of the flexor digitorum superficialis muscle.

SUMMARY

Some of the anatomic features that can be seen on roentgenograms of the canine pectoral limb are illustrated by means of labelled tracings of roentgenograms.

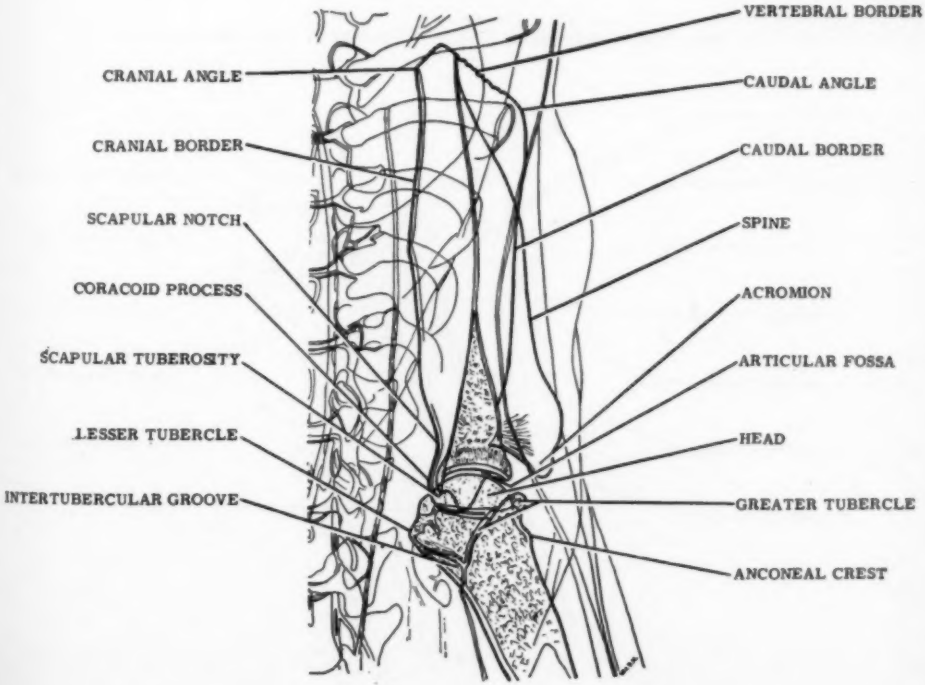


Fig. 5—Mediolateral view of the right humero-radial-ulnar joint of a 12-month-old female German Shepherd Dog.

Fig. 6—Labelled tracing of figure 5.

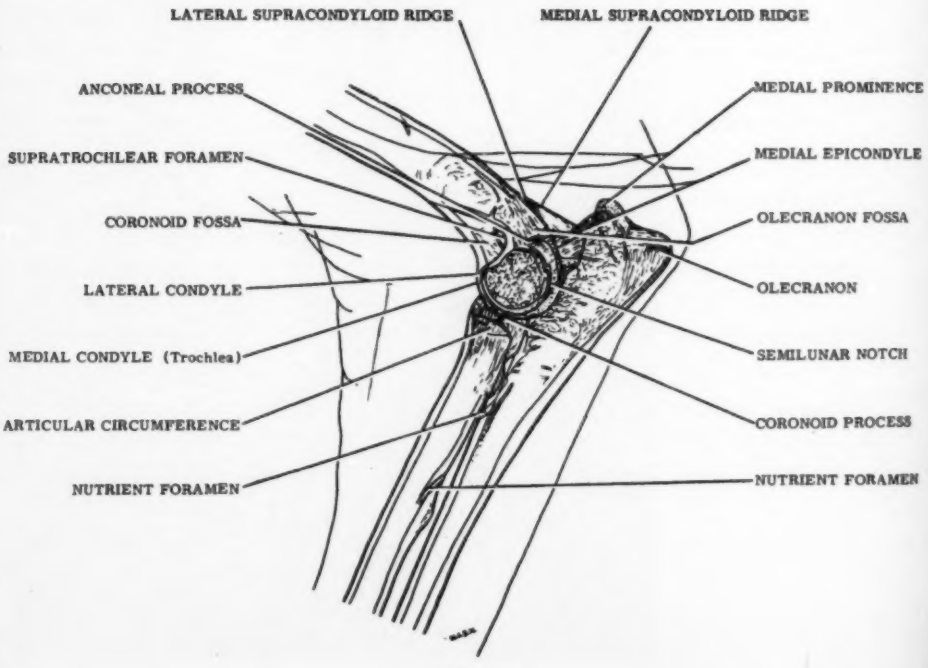


Fig. 7—Dorsoventral view of the right humero-radial-ulnar joint of a 12-month-old female German Shepherd Dog.

Fig. 8—Labelled tracing of figure 7.

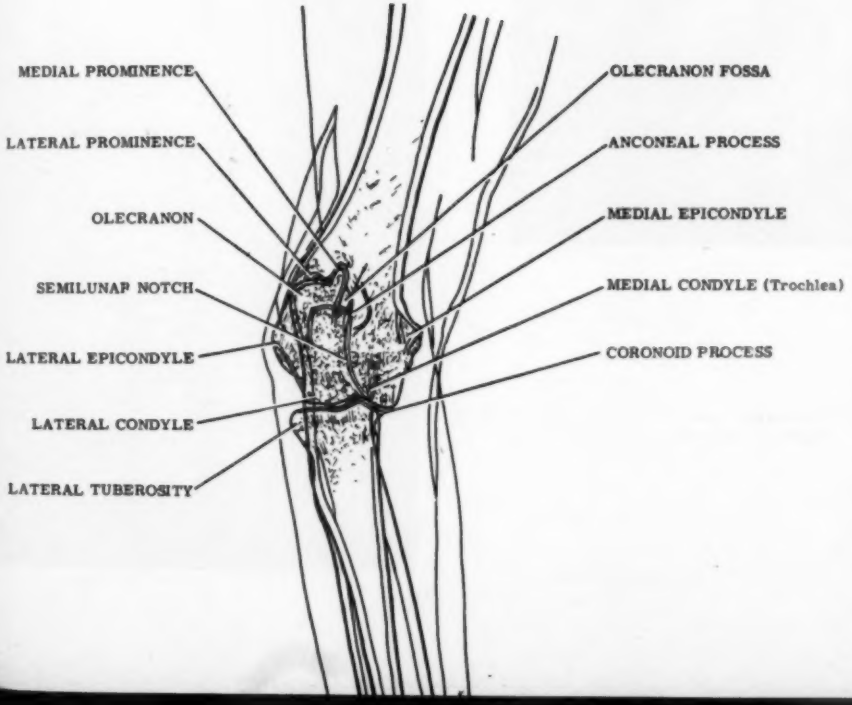


Fig. 9—Mediolateral view of the right paw of a 10-month-old male Scotch Collie.

Fig. 11—Dorsovolar view of the right paw of a 13-month-old male German Shepherd Dog.

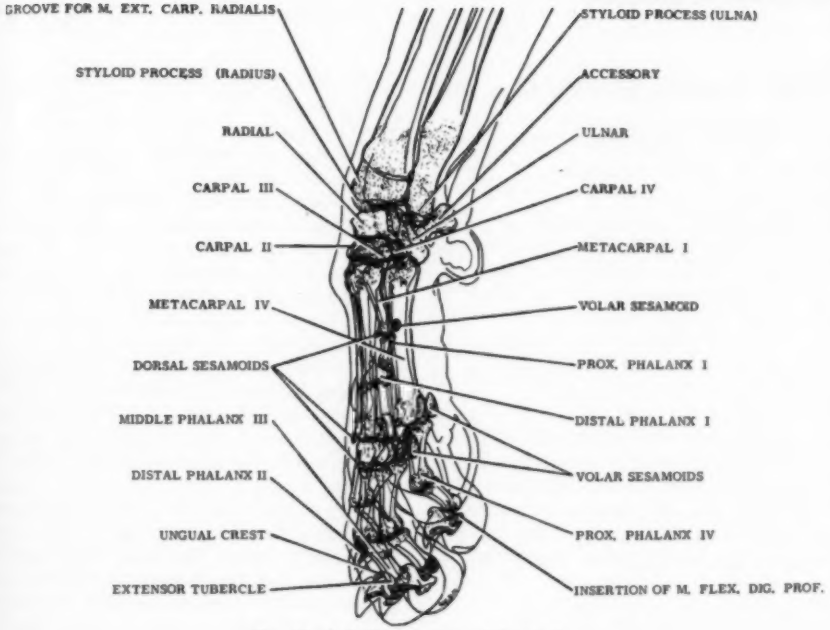
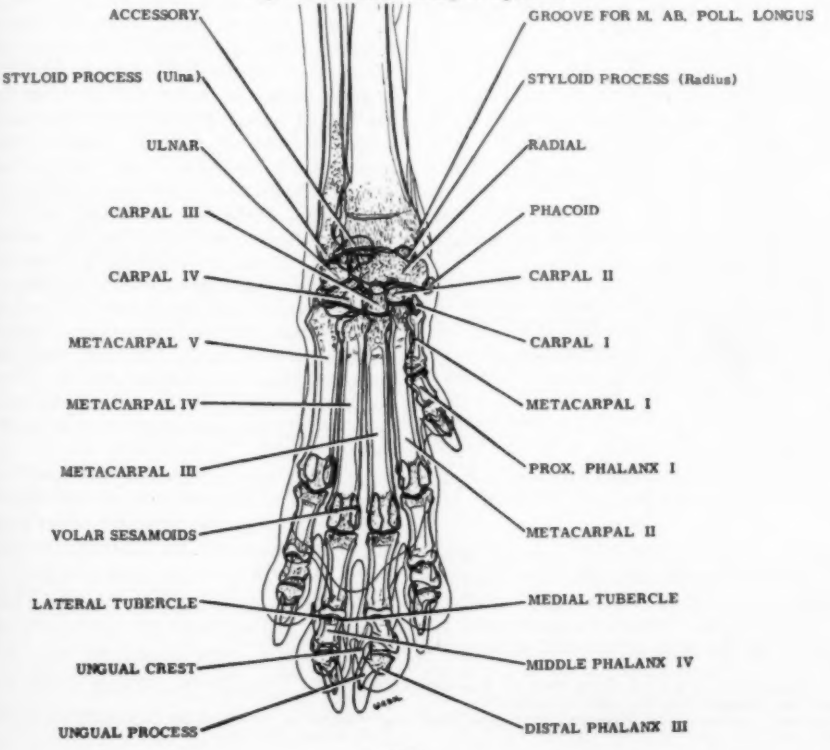


Fig. 10—Labelled tracing of figure 9.

Fig. 12—Labelled tracing of figure 11.



Ruptured Prepubic Tendons in a Dog

PHILLIP T. PEARSON, D.V.M.

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On Feb. 5, 1958, a male Irish Setter, 14 months old, was examined because he had been hit by a car the day before. There was a large ventral swelling 4 to 5 inches in diameter just anterior to the pelvis and extending on both sides of the prepuce. The dog had some difficulty in adducting its hindlimbs, especially on waxed floors.

The swollen area was sensitive. Palpation revealed a hernia which probably contained the urinary bladder and part of the intestines. Although the herniated tissues were traumatized, immediate surgery was deemed advisable to prevent strangulation of the urinary bladder and intestines, or both.

Surgical Procedure and Results

Meperidine hydrochloride (Demerol*) given intramuscularly and pentobarbital sodium given intravenously were used to obtain surgical anesthesia. An L-shaped incision was made through the skin and subcutaneous tissues. The bottom of the "L" crossed the midline anterior to the prepuce and the side of the "L" was on the right side of the prepuce. This incision exposed most of the small intestines and a greatly distended urinary bladder. It was found that the tendons (prepubic) of the two rectus abdominis muscles and the two pectineus muscles had been torn from their pelvic attachments (fig. 1). Only two small tags of tissue about 2 mm. by 2 mm. remained of the former prepubic tendon attachments. This resulted in a hernia ring about 3 inches wide and 1 inch long.

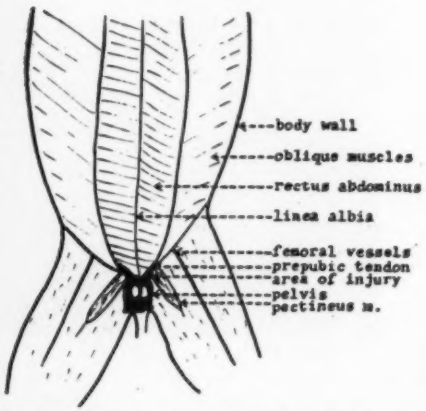

Fig. 1—Sketch showing ruptured prepubic tendons in a dog.

The urinary bladder was drained with a sterile 22-gauge needle and a sterile 20-ml. syringe. To facilitate the return of the intestines and the urinary bladder to the abdominal cavity, the hernia ring was enlarged by cutting forward along the linea alba for 1 inch.

The closing of the hernia presented a problem. There was insufficient tendon tissue left on the pubis to use an artificial mesh for closure. Therefore, it was decided to suture the tissues as well as possible, using what little tendon tissue remained. The incision made in the linea alba was sutured with No. O catgut. It was possible to bring the torn ends of the prepubic tendon to only within ¼ inch of closure. A medium sized, protein-like, synthetic suture material (Supramid**) was used for this. Several diagonal sutures were also placed from side to side to give added strength.

Due to the remaining ¼-inch gap and the lack of strength from the sutures, it was felt that additional support was necessary. The subcutaneous tissue in the area was sutured over the reduced hernia in order to form a "cap" of reinforcement. Great care was taken not to interfere with the femoral vessels in the area. Dead spaces were eliminated with No. OO catgut interrupted sutures and the skin was closed with synthetic mattress sutures.

During surgery, a transfusion of 400 ml. of blood was given to help combat shock.

The dog could walk the next day. At the surgical site, there was some swelling which increased until the fifth day after surgery. When the animal was discharged ten days after entry, the swelling was slight and it was able to walk in a slightly stiff manner.

When the dog was examined six months later, only a slight L-shaped scar was noticeable. The buried sutures could be felt,

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*Demerol is produced by Winthrop Laboratories, New York, N.Y.

**Supramid, produced by Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.

but the hernia ring was completely closed. According to the owner, the dog was able to run and jump as well as before the injury.

Wound Treatment in the Horse

It is questionable if antiseptics should be used on a fresh wound, for they have little value in destroying bacteria in the muscle tissue. If the wound is several hours old and appears to be infected, it may be flushed with an aqueous antibiotic solution. Some of the sulfonamides are good, but should not be used in powder form. A fine crystalline dust is adequate. Antiseptic powders combine with the wound exudate to form a hard inert crust. This retards the escape of exudate, causes edema of the tissues, and delays healing.

Wounds should be carefully cleaned of all hair, exudate, shreds of devitalized tissue, blood clots, and foreign material. Next, they may be lightly flushed with sterile physiological saline solution to wash off most of the surface bacteria. Wounds that contain much debris may be cleaned with a neutral soap and water or a detergent that has antiseptic value.

Whether to suture is debatable. A wound should not be sutured unless it has certain characteristics. It should be almost free of crushed tissues, the edges should have an adequate blood supply, and it should be free of foreign material. The edges should not be sutured under tension as this restricts the blood supply and results in sloughing. Suturing of muscle tissue is usually contraindicated.

Granulation tissue is essential to the healing of wounds, and in the absence of epithelial and endothelial tissue, is the body's best defense against invasion of bacteria. Therefore, protection of the granulation tissue and its surface cell medium from trauma and insults of any nature is of paramount importance in wound healing.

Wounds below the knee or hock should be bandaged, because they are prone to develop exuberant granulation tissue. This is due to irritation from infection, bedding, foreign material, harsh medication, and the horse rubbing on the wound with his muzzle. This type of wound should have special care to keep it clean and healthy. A pressure pack applied under bandage until a layer of healthy granulation tissue is formed is the best method to control the growth of granulation tissue.

Urea is valuable for wound debridement. Incorporated with some of the sulfonamides in crystalline form, it makes an excellent wound dressing. It may be used in the dry form or mixed with mineral oil to make an emulsion. Protection of the wound is important. Sterile gauze under sheet cotton bandage will control capillary seepage and also aid in holding the tissues in a near normal position.—*E. F. Ebert, D.V.M., Columbia, Mo., at the 1959 meeting of the Missouri V.M.A.*

New Concepts in Wound Treatment

A number of significant improvements in the handling of surgical wounds have occurred in recent years. They further emphasize but have not changed the requisites for aseptic technique, hemostasis, and gentle handling of tissues.

The new features include use of fibrinolytic and proteolytic enzymes, antibiotics, anti-inflammatory agents, and nonadherent dressing. Antibiotics are an advantage chiefly when used systemically. Their application to the wound has few advantages and many disadvantages, the latter being chiefly stimulation of bacterial resistance and the delaying of healing. The most useful nonadherent dressing is rayon mesh impregnated with a light mineral oil. —*Am. J. Surg. (April, 1959): 429.*

Effects of Vasectomy on the Animal

When young rats were vasectomized and their testicles removed and examined two weeks to six months later, it was found that a degeneration of the seminiferous tubules occurred, but it was either incomplete or temporary. There was a proliferation of the interstitial tissue of the testes.

A survey of 290 vasectomized men revealed that six had diminished sexual capacity, 86 had increased capacity, and 198 had no change. *J.Am.M.A. (June 6, 1959): 735.*

The Importance of Debridement

In treating compound fractures, debridement is paramount and should be done as soon as possible. The availability of antibiotics does not decrease the necessity for, nor the extent of, debridement.—*J.Am.M.A. (April 25, 1959): 2033.*

Clinical Data

Studies on the Syndrome Called Mycotic Stomatitis of Cattle

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ONE OF THE MOST widespread and commonly occurring stomatitides of cattle in the United States is a disease that is commonly called mycotic stomatitis.[1,3] Despite its widespread occurrence and commonplace character, little is known about this disease. The cause is as obscure today as it was over 50 years ago when it was first called mycotic stomatitis;[2] molds were observed on plants consumed by the cattle so it was theorized that the disease was caused by a fungus.

The term "mycotic stomatitis" is used here to denote a specific clinical syndrome. We do not necessarily subscribe to the etiological significance of the name.

Fig. 1—The first clinical sign of mycotic stomatitis in a cow was slobbering.

Most of the observations reported in this manuscript were made in Indiana, from 1954 to 1956, and in Florida, in 1957 and 1958. We also have observed instances of this disease in Alabama, Colorado, Georgia, Idaho, Illinois, Kentucky, Missouri, Nebraska, Oregon, Pennsylvania, and Washington. No major differences were noticed in the clinical appearance of the disease in these various states.

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OCCURRENCE AND DISTRIBUTION

Mycotic stomatitis occurs in the late summer and early fall. We have never observed cases at other times of the year. In Indiana, the first cases appeared during the last week of July and additional ones occurred until the second week in October. In Florida, the first cases also occurred during the last week of July, but new cases continued to appear until the last week of November.

There appeared to be variations in the incidence of this disease from year to year. For example, in 1957 nearly all the herds of cattle in the northern third of Florida had affected animals, while in 1958, it is estimated that cases occurred in less than 10 per cent of these herds. In Indiana, veterinarians and farmers long have associated the highest incidence of this condition with dry seasons, but in Florida the highest incidence of disease has been associated with wet seasons. Evidence of a relationship between the incidence of mycotic stomatitis and the weather is not entirely convincing.

Mycotic stomatitis is indigenous to an area that roughly comprises the lower five eighths of the country. Cases ordinarily have not occurred north of a line drawn from Baltimore to Salt Lake City and extended to Vancouver, B.C. However, in years when the incidence is especially high, cases occur as much as 200 miles north of the aforementioned line.

CLINICAL OBSERVATIONS

The chief clinical signs of mycotic stomatitis were stomatitis, superficial erosions of the epidermis, and lameness. Stomatitis and epidermal exfoliation generally were more marked in older animals and lameness less marked, while in younger animals lameness was most pronounced and stomatitis less severe.

The first sign of disease was slobbering

(fig. 1). At about the same time, small erosions or ulcers could be detected on the mucosa of the lips, dental pad, and anterior margins of the tongue. Within a few days, these lesions had become covered with accumulations of necrotic tissue. Usually, in about one week, extensive necrosis of the mucosa of the anterior part of the oral cavity and tongue had occurred. In most cases only the anterior portion of the oral cavity was affected; however, in severe cases necrosis of the tongue, entire oral cavity, and muzzle (fig. 2) had occurred. The breath had an extremely fetid odor.

Lameness which appeared to be caused by laminitis occurred early in the course of the disease. Affected animals lay most of the time and were extremely reluctant to rise. Severely lame animals generally walked on their heels, with a stiff gait. A few appeared to walk on their toes, with a stilted gait.

In many herds, lameness was the only sign of disease in young animals. Marked subcutaneous edema above the hoof occurred in many young animals. A bluish line above the coronary band, similar to that described in cases of blue tongue in sheep, was noticed in some animals. This line was most marked on the posterior aspect of the foot. Many animals were sensitive to palpation of this region. Some lameness usually persisted for two to three weeks. Many older animals with severe oral involvement exhibited little or no lameness during the entire clinical course.

Exfoliation of the epidermis of the teats, udder, and perineal region sometimes occurred. It was seen in black animals as well as those with nonpigmented skins.

Some animals showed nasal discharges. Severely affected animals had profuse diarrhea with much mucus and blood in their feces.

There was marked variation in the duration of this syndrome. However, except in extreme cases, recovery generally had occurred in one to three weeks.

The only striking pathological changes found at necropsy, other than necrotic stomatitis and epidermal exfoliation which were visible clinically, were hyperemia, hemorrhage, and necrosis of the alimentary canal extending from the omasum to the rectum. Histologically, there was marked infiltration of the lamina propria with eosinophils and lymphocytes in addition to necrosis. Fungi were found in some of the open oral lesions.

MORBIDITY AND MORTALITY

The herd morbidity rate usually was low. Generally, only a few animals in a herd were markedly affected. However, when all the animals in an affected herd were examined, many others were found to have slight mouth lesions. In Florida, the highest morbidity rate, considering only severely affected animals, was 34 per cent of a herd of 100 cows in 1957. Many herds of 200 to 600 cows had morbidity rates of 10 to 20 per cent. In Indiana, the morbidity rate usually was much lower; ordinarily only 1 or 2 animals in a herd of 10 to 60 were affected.

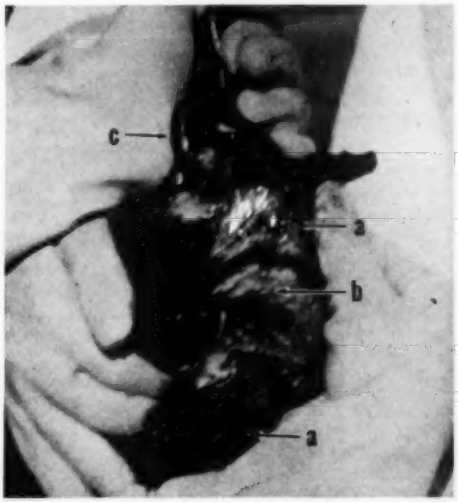

Fig. 2—In severe cases there is extensive necrosis of the muzzle and of the mucosa of the oral cavity, especially of lips (a), dental pad (b), and tongue. Notice the accumulations of necrotic debris; (c = nose tongs).

Few animals died as a result of mycotic stomatitis. Most of those which died seemed to succumb to secondary bacterial infections. The highest mortality recorded by us was 7 out of a herd of 240 registered Jerseys, in Florida, in 1957.

EXPERIMENTAL OBSERVATIONS

Experiments were conducted to determine whether or not mycotic stomatitis could be transmitted to cattle and other

animals under controlled conditions (table 1). Materials for inoculations were obtained by scraping early stage mouth lesions in 43 animals in 32 herds. The scrapings were suspended in buffered saline solution and ground with a mortar and pestle.

Forty-one cattle ranging in age from 2 months to 8 years were confined in tight isolation units or held under relative isolation in pasture plots and inoculated with the supernatant fluid by intravenous, intramuscular, subcutaneous, conjunctival, and intradermal routes. Mixtures of the supernatant fluid and the precipitate were administered by oral, intranasal, and rectal routes to 6 yearlings. It also was rubbed into freshly scarified oral mucosa, muzzle, and tongue. Whole blood from animals in the early stage of the disease was given intravenously, intramuscularly, and subcutaneously to 5 yearlings. Feces obtained from affected animals at a time when much blood and mucus were present were given by oral and rectal routes to 3 calves, 6 months old.

Four adult horses, 6 lambs varying from 4 to 6 months of age, and 2 yearling goats were held in pasture lots and inoculated intravenously, intramuscularly, intranasally, subcutaneously, orally, and intradermally on the upper lip with supernate of ground scrapings from animals with early field cases. Freshly scarified mucosa on the tongue and lips was inoculated with ground suspensions of scrapings.

TABLE I—Summary of Transmission Experiments with Mycotic Stomatitis

Species	No.	Age	Inoculum	Route of inoculation	Results
Cattle	41	2 mo.-8 yr.	Supernate of saline suspension of scrapings from lesions	i.v., i.m., s.c., i.c., i.d.	No transmission
Cattle	6	1 yr.	Suspension of scrapings from lesions	i.n., r., sc.o.m.t. o.	No transmission
Cattle	5	1 yr.	Whole blood	i.v., i.m., s.q.	No transmission
Cattle	3	6 mo.	Feces containing blood and mucus	o., r.	No transmission
Horse	4	Adult	Suspension of scrapings from lesions	i.v., i.m., i.n., s.c., o., i.d., sc.o.m.t.	No transmission
Sheep	6	4-6 mo.	Suspension of scrapings from lesions	i.v., i.m., i.n., s.c., o., i.d., sc.o.m.t.	No transmission
Goat	2	1 yr.	Suspension of scrapings from lesions	i.v., i.m., i.n., s.c., o., i.d., sc.o.m.t.	No transmission
Mice	72	Suckling	Suspension of scrapings from lesions	i.p.	No transmission
Mice	72	Weanling	Suspension of scrapings from lesions	i.p.	No transmission
Guinea pig	24	10 days	Suspension of scrapings from lesions	i.p.	No transmission
Guinea pig	12	14 days	Suspension of scrapings from lesions	Foot pad	No transmission

i.v.=intravenous; i.m.=intramuscular; s.c.=subcutaneous; i.c.=in the conjunctival sac; i.d.=intradermal; i.n.=intranasal; o.=orally; r.=rectally; sc.o.m.c.=scarified oral mucosa, muzzle, and tongue; i.p.=intraperitoneal.

Seventy-two suckling and 72 weanling mice, 24 guinea pigs, 10 days old, and 12 white rats, 3 weeks old, were inoculated intraperitoneally, and 12 guinea pigs, 2 weeks old, were inoculated in the foot pads with ground suspensions of scrapings. Equal numbers of noninoculated controls of all species were used. All of the animals were examined each day, and rectal temperatures of the cattle, horses, sheep, and goats were taken daily.

No clinical signs suggestive of mycotic stomatitis or any other disease were observed in any of the experimentally inoculated animals. A spontaneous case of this disease occurred in 1 of the uninoculated control calves during studies in 1957. These animals had been held in pasture lots.

Serums from cattle that had recovered from mycotic stomatitis were collected in

Florida, in 1957, between 30 and 60 days after the onset of clinical signs. These serums were submitted to the Agricultural Research Service, Animal Disease Eradication Branch, Vesicular Stomatitis Testing Laboratory, Beltsville, Md., to be tested for vesicular stomatitis by complement-fixation and serum-neutralization techniques. All of the tests were negative (table 2).

TABLE 2—Results of Testing* Bovine Serums for Vesicular Stomatitis after Recovery from Mycotic Stomatitis

Herd	Animals (No.)	Complement-fixation		Serum-neutralization	
		N. Jersey	Indiana	N. Jersey	Indiana
A	1	Neg.**	Neg.	Neg.	.....
B	1	Neg.	Neg.	Neg.	.....
C	1	Neg.	Neg.	Neg.	.....
D	6	Neg.	Neg.	Neg.	.....
E	1	Neg.	Neg.	Neg.	.....
F	5	Neg.	Neg.	Neg.	.....
G	1	Neg.	Neg.	Neg.	Neg.
H	1	Neg.	Neg.	Neg.	.....
I	1	Neg.	Neg.	Neg.	.....
J	2	Neg.	Neg.	Neg.	.....

*Tests were conducted by Animal Disease Eradication Branch, Vesicular Stomatitis Testing Laboratory, Beltsville, Md; **Neg. — negative.

DISCUSSION

The results obtained in this study suggest that it is somewhat unlikely that mycotic stomatitis is transmissible by ordinary means, although these studies are not sufficient to completely rule out an infectious agent. We hope that others will make further attempts to transmit this disease.

Studies on the role of fungi as a causative factor were not conducted, but fungi were especially prevalent on pasture plants during the periods when mycotic stomatitis occurred. However, we have observed 2 cases of mycotic stomatitis in cattle confined to barns and to feeds that appeared to be free of molds. Both of these cases occurred during the mycotic stomatitis "season." Cases were observed in 1957 in south Florida in dairy cattle fed moldy forage obtained from an area in north Florida where many cases of mycotic stomatitis were occurring. No other cases were observed within 100 miles of that south Florida area. The role of fungi as a causative factor must be determined experimentally.

Some investigators suggest that mycotic stomatitis is a form of vesicular stomatitis, presumably because there are some clinical similarities between the two syndromes. Our negative transmission studies and failure to demonstrate serum-neutralizing or complement-fixing antibodies for vesicular stomatitis in convalescent serums is strong evidence that mycotic stomatitis is not a form of vesicular stomatitis.

SUMMARY

The chief clinical signs observed over a five-year period in extensive occurrences of the syndrome called mycotic stomatitis of cattle in Indiana and Florida were necrotic stomatitis, epidermal exfoliation, and lameness.

Mycotic stomatitis could not be transmitted experimentally to cattle, horses, sheep, goats, mice, rats, and guinea pigs inoculated with scrapings from lesions, blood, or feces from naturally affected cattle.

Serum-neutralizing or complement-fixing antibodies for the Indiana or New Jersey strains of vesicular stomatitis were not detected in cattle that recovered from mycotic stomatitis.

References

[1]Anon.: Mycotic Stomatitis. Jen-Sal. J., 39, (1956): 2-4.

[2]Mohler, J. R.: Mycotic Stomatitis of Cattle. U.S. Bureau of Animal Industry, Circ. 51, 1904.

[3]Udall, D. H.: The Practice of Veterinary Medicine. 6th revised ed. Published by the author, Ithaca, N. Y., 1954.

[For the record, 4 cases of bovine mycotic stomatitis were diagnosed in Northwest Iowa in ten days (Aug. 26 to Sept. 5) in 1932. The affected animals, 3 heifers from 6 to 24 months old and a cow, were in separate, thin-soiled pastures within a three-mile area; the season was dry, the grass short and brown. All 4 animals walked stiffly due to foot tenderness; the calf had purplish coronets and interdigital ulcers. All had dry, cracked muzzles and bluish oral mucosas with necrotic areas. The epidermis exfoliated from the cows' teats. The pregnant heifer aborted and had a uterine discharge for several weeks. All eventually recovered.—W.A.A.]

Sterility of Antibiotic Ointment

Of 46 samples of antibiotic ophthalmic ointments, representing 19 batches from ten manufacturers, five (all from 2 batches) were contaminated both with bacteria and molds. In a previous report, only 39 per cent were sterile.—*J. Am. Pharm. A. (Feb., 1959)*: *95*.

Leeches (Hirudineans) in the Teat Canals or Udders of Cattle

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The leech, class Hirudinea of the phylum Annelida, has a muscular elongated, ovoid body provided with two suckers, one surrounding the mouth and one at the posterior end. It is commonly found in fresh water and is especially abundant in semitropical areas either in the aquatic or terrestrial rain forests, where hirudiniasis is common.

Leeches are parasitic in the posterior pharynx, larynx, epiglottis, and esophagus of man.[1] Bathers have become infected, with involvement of the vagina, labium majus, and male urethra. Hirudiniasis is common among people in tropical regions. The author has observed leeches attached to the legs of people working in rice paddies in China. He also observed an unusual condition of labored breathing in a horse in China in 1943 and, upon examination, a leech 8 inches long was found protruding from the nasal passage. The leech, *Himnatis nilotica*, was removed with chloroform.

The occurrence of leeches in the teat canals or udders of cattle in a milking herd in Hillsboro County, Florida, was brought to the attention of the author in July, 1958. The herd consisted of approximately 300 head of grade and crossbred dairy cows. Examinations were made at milking time in late August, 1958. No leeches were found attached to the external surfaces of the cows. The teats and udders were normal in appearance, and no leeches were observed during the process of washing the udders with warm water delivered from a fine spray. It was routine procedure at this farm to express a small amount of milk from each teat from all animals into a strip cup prior to attaching the milking machines. Five leeches identified* as *Macrobdella ditetra* (Moore) and 1 specimen of the genus Haemopis were milked from the teats of 3 different cows. The leeches were about 3 inches long when extended and approximately 1 inch long when contracted.

The leeches apparently caused the cows no distress although they were extremely active when expelled. No further reports of leech infestation have been received. Gross pathological changes as a result of these parasites were not detected and no treatment was required. Previously, 25 leeches had been collected from the strippings or from the milk strainer by the attendant.

The pastures were examined for leeches but none were found. However, fresh water ponds where the cows may have obtained the leeches were present in the pasture, and cows were observed lying in the ponds. It was recommended that the pasture be eliminated and the ponds be drained.

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*Dr. M. C. Meyer, University of Maine, identified this leech.

[1]Faust, Ernest C.: Animal Agents and Vectors of Human Disease. Lea and Febiger, Philadelphia, Pa. (1956): 443-449.

Pathogenicity of Various *Escherichia coli* Serotypes

In the studies of strains of *Escherichia coli*, found in newborn calves naturally infected with scours, the strains could not be distinctly grouped as pathogens and nonpathogens. Of seven strains used in experimental transmission of calf scours, either by feeding of broth culture or by contact with affected calves, four strains (026, 08, 0119, and 03) caused typical fatal scours when the calves were deprived of colostrum. Under similar conditions, the other strains did not produce disease.

Calves given colostrum usually had antibodies for four strains (026, 03, 020, and 086) and were resistant to infection with these strains. Agglutinins for strains 0119 and 08 were found less frequently in the serums of the dam and calf and, due to this lack of protection, these strains were more often isolated from calves with scours.—*P. J. Glantz (abstr. of Ph.D. thesis), Pennsylvania State University.*

Brucella suis Vaccine for Cattle

When pregnant cows were inoculated with a live vaccine made from *Br. suis* strain 64, in Russia, it did not cause abortion but the protection against *Br. abortus* infection was less than with strain 19 vaccine. Antibodies were present in the serum of 20 per cent of the cows for three years and in 12 per cent for five years.—*Vet. Bull. (April, 1959): Item 989.*

The Prevention of Virus Enteritis in Newly Weaned Mink Kits by the Use of an Homologous Tissue Vaccine

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VIRUS ENTERITIS of mink was recognized as a specific disease entity when it appeared in the area of Fort William, Ont., in the late 1940's. It has since been reported in other parts of Ontario, in Manitoba, British Columbia, and several states in the United States of America. The author[3] who first characterized the disease clinically and histopathologically believed it to be caused by a virus.

In 1952, the development and value of a formolized tissue vaccine made from the spleens and livers of infected mink was reported.[5] The vaccine was effective when used experimentally and also was useful on a ranch where an outbreak was occurring. On this ranch alternate animals in the rows were vaccinated and a daily record kept of the appearance of new cases. The morbidity, mortality, and duration of the outbreak was sharply limited in the vaccinated mink as compared with their controls. Following vaccination, 23.8 per cent of 202 vaccinates became infected in contrast with 58.6 per cent of 123 controls. This difference was highly significant statistically when measured by the chi-square test. The incidence of new cases in the vaccinated animals dropped abruptly between the ninth and eleventh day following vaccination, while the incidence in the unvaccinated animals continued to rise for another six days and was followed by a slow decline. Because the disease was widespread on the ranch, undoubtedly many of the treated animals were in the incubative stages at the time of vaccination.

Since 1951, the Ontario Veterinary College has supplied homologous vaccine to ranches when outbreaks have occurred.[6] This vaccine was prepared from the livers and spleens of mink that had just died in natural epizootics. Despite recommendations once made that two doses of 2 cc. of the vaccine be given one week apart, ranchers generally became satisfied that one dose of 2 cc. was adequate to control the disease, the effectiveness of the one dose becoming apparent in most cases in about ten days after vaccination.

In 1952, a similarity between mink virus enteritis and infectious feline enteritis was recognized.[5] It was shown by serological cross-protection tests that the diseases were antigenically related and that the mink virus produced typical infectious feline enteritis in cats.[5]

In 1956, the effectiveness of commercial feline distemper (infectious feline enteritis) vaccine in preventing virus enteritis of mink was demonstrated.[4] The transmission of feline enteritis virus to mink was reported in the same year.[1]

Commercial infectious feline enteritis vaccine when used in the field left some doubt as to its effectiveness. While many ranchers have used vaccines of feline origin with apparent satisfaction, others became unwilling to use these products. One batch, widely used because the price was considerably lower than competitive brands, was ineffective experimentally in mink when two doses of 2 cc. were given one week apart, whereas infectious feline enteritis vaccine from a different manufacturer was effective in a single dose of 1 cc.[2]

The difficulties and expense encountered in the preparation of infectious feline enteritis vaccine, due in part to the scarcity of susceptible cats, are well known. It appears, also, that some feline vaccines of unsatisfactory antigenicity reach the market. Dependence for vaccine upon mink dead in natural outbreaks presents the obvious disadvantage that prophylactic vaccination can not be practiced. The value of rapid diagnosis and immediate vaccination of the entire herd when the disease occurs cannot be overemphasized. While the needs of Ontario's ranchers in the latter circumstance were always met, the supply of vaccine often barely kept up with demand, and was subject to diminishing returns. Further-

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The cooperation of Connaught Medical Research Laboratories, Toronto, Canada; Canada Mink Breeders Association; St. Mary's Mink Breeders Association, Ontario; and the British Columbia Mink Breeders Association is acknowledged.

more, the potency of small batches could not be assayed economically.

The decreasing susceptibility of mink kits with age was regarded as posing a problem when considering the mass production of homologous vaccine from mink at pelting age. It will be shown in this paper that the virus content of several tissues of mink artificially infected at pelting age is sufficient to allow the preparation of a vaccine which may be safely and effectively stored and used on newly weaned kits and that the immunity produced endures in them to pelting time.

MATERIALS AND METHODS

Experimental Animals.—Mink kits were derived from a heavily concentrated area of ranches where about 34,000 kits are born annually, and where the disease had been enzootic for three years.

Each of the ranchers contributed a proportion of his kits for experimental use, in return for which he was supplied at cost with vaccine for the remainder of his herd. One rancher volunteered to leave his herd unvaccinated.

The experimental animals were identified, vaccinated, or left as controls or for other purposes, and set aside on the ranch of origin. They were withdrawn for challenge as required.

Vaccine.—Vaccine* was produced from tissues of mink artificially infected with the virus at pelting age. The method was that used by Wills for mink enteritis vaccine production at the Ontario Veterinary College. This was the same as traditional practices in the preparation of tissue vaccines for several other virus diseases.

Tissues were blended to give a 15 per cent suspension in chilled physiological saline solution and strained free of coarse particles. Fresh formalin was added to give a concentration of 0.3 per cent. The vaccine was incubated for 24 hours at 37 C., and thereafter refrigerated. Standard tests for bacteriological sterility were made.

Two lots of vaccine were produced and identified as lot A and lot B. Lot A was prepared from the spleens and livers of mink killed on the first or second day of sickness (five to nine days after administration of the virus). Lot B was prepared from the intestines and kidneys of the same mink, and the livers and spleens of the few mink which, though given the virus, showed no clinical evidence of infection.

Challenge.—The virus was serially passed through young mink to maintain potency and was used immediately for challenge or stored no longer than two days at −20 C. The challenge dose was 5.0 cc. of a 20 per cent suspension of liver and spleen in physiological saline solution given by stomach tube.

Criterion of Infection.—Positive cases of virus enteritis were recorded when typical droppings, accompanied by sudden and complete anorexia, followed challenge within four to nine days. The droppings characteristic of the disease are gray, white, or cream-colored slimy mucus which may be thick, thin or curdy, and occasionally, bloody. A diagnostic feature of the condition is the frequent presence of casts in the droppings. These are formed cylindrical bodies, 1 or 2 inches long and composed of mucus, fibrin, ingesta, and epithelial cells. They are dull yellow or gray in color, often with a pink tinge.

A few cases were recorded as "suspicious" for virus enteritis. These mink showed droppings more or less abnormal as described above within the stated time period, but accompanied by only partial or no loss of appetite.

PRELIMINARY SAFETY AND POTENCY TESTS

Before issuing vaccine for use in the field, two tests were made on each lot for safety and potency. Because the first test on lot A and lot B was done at different times using, therefore, two different challenge preparations of indeterminable potency, the results for challenge No. 1 and 2 have been recorded separately (table 1).

In a second test, the vaccine lots were tested concurrently with the same challenge virus, preparation No. 3, for both lots (table 1).

Mink were given 5.0 cc. of the vaccines by stomach tube to determine if the virus was effectively inactivated. The controls were contact controls in view of the possibility that residual virus, if any, might produce inapparent infection and become more active by contact passage.

Abscesses have been observed occasionally following vaccination with Wills' tissue vaccine. Mink were therefore given 4.0 cc.

*Produced by Connaught Medical Research Laboratories, Toronto, Canada.

TABLE 1—Homologous Tissue Vaccine Against Virus Enteritis of Mink; Safety and Potency Tests on Vaccine, Lot A and Lot B

Vaccine lot	Dose	Administration	Challenge virus No.	No. challenged	No. sick*	No. died
A	5 cc.	Oral	1	10	2	—
A	2 cc.	Subcutaneous	1	15	1	—
A	4 cc.	Subcutaneous	1	4	0	—
	Control	———	1	22	7	—
B	5 cc.	Oral	2	5	5	—
B	2 cc.	Subcutaneous	2	19	0	—
B	4 cc.	Subcutaneous	2	5	0	—
	Control	———	2	20	17	—
A	5 cc.	Oral	3	5	3	2
B	5 cc.	Oral	3	5	3	1
A	2 cc.	Subcutaneous	3	5	0	0
B	2 cc.	Subcutaneous	3	5	1	0
A	4 cc.	Subcutaneous	3	5	0	0
B	4 cc.	Subcutaneous	3	5	0	0
	Control	———	3	15	13	6

*Mink given challenge virus No. 1 and 2 were killed on appearance of infection.

subcutaneously at one site and were examined daily for ten days for reactions.

Since 2.0 cc. subcutaneously was proposed as the dose to be given in the field, this level was tested for its ability to protect. Two weeks after dosing or vaccination, all mink were challenged.

Results.—There was no evidence of infection in the mink given the vaccine orally or in the contact controls in a 14-day period. No abscessation was observed. The results of the challenge are recorded (table 1).

The mink given the vaccine orally are seen to be susceptible to the same degree as the controls. The results are not clear-cut in the first test of lot A but it will be seen that the controls were relatively insusceptible to the challenge given. In the second test, the challenge virus (No. 3) was more effective and here also the mink given the vaccine orally were as susceptible as the controls (table 1).

A high degree of protection is seen to be afforded by a single, subcutaneous dosing with either 2.0 cc. or 4.0 cc. (table 1). As anticipated, a single dose of 2.0 cc. was therefore recommended for use in the field.

TITRATION OF ANTIGENICITY AND DURATION OF IMMUNITY

In order to further assess the potency of the vaccine in newly weaned kits and to establish whether protection endured to pelting time, further tests were performed. Groups of mink kits, randomized as to ranch origin, were vaccinated once with doses of 0.5, 1.0, and 2.0 cc. of lots A and B in the first week of July. Groups of kits

TABLE 2—Homologous Tissue Vaccine Against Virus Enteritis of Mink; Results of Challenge at Intervals of Three Weeks and Four Months Following Vaccination with Different Dose Levels of Vaccine, Lot A and Lot B

	Vaccine lot	Dose	No. challenged	No. sick	No. suspicious	No. died
Challenged 3 weeks following vaccination	A	0.5 cc.	10	1	0	1
	B	0.5 cc.	10	0	6	0
	A	1.0 cc.	10	0	0	0
	B	1.0 cc.	10	0	1	0
	A	2.0 cc.	10	0	1	0
	B	2.0 cc.	10	0	1	0
		Control	20	16	4	13
Challenged 4 months following vaccination	A	0.5 cc.	10	1	0	0
	B	0.5 cc.	10	0	0	0
	A	1.0 cc.	10	0	0	0
	B	1.0 cc.	10	1	1	0
	A	2.0 cc.	10	0	0	0
	B	2.0 cc.	10	0	0	0
		Control	19	14	0	7

representing each dose level and the controls were withdrawn for challenge at two intervals after vaccination. These intervals were after three weeks and after four months.

Results.—The results of challenge three weeks following vaccination are given (table 2). The results of challenge four months after vaccination are also given (table 2). It is apparent that all dose levels of both lots of vaccine afforded protection against a challenge which produced severe illness or death in the majority of controls.

As a result of challenge three weeks after vaccination, 16 of 20 controls showed unmistakable signs of virus enteritis and 13 died. Of 60 vaccinated mink, only 1 showed definite signs. This animal had been given the 0.5-cc. dose and it died.

As a result of challenge four months after vaccination, 14 of 19 controls showed unmistakable evidence of virus enteritis and 7 died. Of 60 vaccinated mink, only 2 were obviously ill and none died.

It would appear that the 0.5-cc. dose of lot B in the three-week challenge experiment (table 2) was approaching the limit of the vaccine's antigenicity since 6 of 10 mink are recorded as possibly infected. This was not apparent in the four-month challenge due, perhaps, to the imposition of resistance because of increasing age upon borderline immunity induced by the vaccine. However, because differences in potency of challenge virus cannot be determined, exact comparisons are not possible.

FIELD USE OF THE VACCINE

About 33,000 kits on 26 cooperating ranches were vaccinated during the first ten days of July with a single dose of 2.0 cc. Animals on three ranches evidenced the disease before vaccination could be accomplished. Later it occurred in the herd of the one rancher who had volunteered not to vaccinate. Immediate vaccination in each case appeared to control spread and losses were low. There were approximately 97 deaths among the 3,400 mink on these four ranches.

Clinical signs of the disease with an occasional death occurred on at least four other ranches with vaccinated animals previous to pelting but with no serious consequences. It was apparent that the virus was widespread in the area.

SUMMARY AND CONCLUSIONS

Homologous formolized tissue vaccine devised by Wills for the prevention of virus enteritis of mink was found adaptable to commercial production using mink artificially infected at pelting age.

Two lots of vaccine, derived from different tissues, were found free of residual infectivity when given by stomach tube and did not produce undesirable local or systemic reactions upon subcutaneous injection.

The vaccine was demonstrated to have considerable reserve antigenic potency. The recommended single dose for newly weaned kits was 2.0 cc. but a single dose of 0.5 cc. gave good protection against strong experimental challenge, and immunity endured for at least four months after vaccination.

The vaccine was used prophylactically on about 33,000 kits. Despite evidence that the virus was widely distributed throughout the vaccinated area, losses from virus enteritis were negligible.

References

[1]Macpherson, L. W.: Feline Enteritis Virus. Its Transmission to Mink under Natural and Experimental Conditions. Canad. J. Comp. Med., *20*, (1956): 197-202.

[2]Pridham, T. J., and Wills, C. G., Ontario Veterinary College, Guelph, Ont.: Manuscript in preparation.

[3]Schofield, F. W.: Virus Enteritis in Mink. North Am. Vet., *30*, (1949): 651-654.

[4]Wills, Gordon, and Belcher, Joan: The Prevention of Virus Enteritis in Mink with Commercial Feline Panleukopenia Vaccine. J.A.V.M.A., *128*, (June 1, 1956): 559-560.

[5]Wills, C. G.: Notes on Infectious Enteritis of Mink and Its Relationship to Feline Enteritis. Canad. J. Comp. Med., *16*, (1952): 419-420.

[6]Wills, Gordon: Infectious Enteritis of Mink. Fur Trade J. Canada, *30*, (1953): 10-29.

A Miyagawanella Virus in Sheep

A virus of the psittacosis-lymphogranuloma group was readily isolated from the feces of 8 of 25 apparently healthy sheep in Japan. Six months later, 1 sheep was still excreting the virus which was closely related to the bovine psittacosis-lymphogranuloma virus and to the caprine pneumonitis virus. It is not known what types of disease the isolated virus can produce in sheep.—*Y. Kawakami et al. in Bull. Nat. Inst. Anim. Health (Japan) No. 36 (1958): 77.*

Sweet Clover Poisoning in Newborn Calves

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SWEET CLOVER poisoning was first described in 1924[15] as a fatal hemorrhagic anemia caused by feeding spoiled sweet clover hay or silage. Since that time, it has been established that the toxic agent is dicumarol[3] or bishydroxycoumarin, and that this is formed from coumarin in sweet clover by certain types of microbial spoilage.

It has also been established that dicumarol reduces blood levels of prothrombin,[13] a plasma protein essential to normal blood clotting. Some steps in the clotting process, and in the way in which dicumarol interferes with this process, are still imperfectly understood. There is considerable evidence that dicumarol prevents the utilization by the liver of vitamin K, and that this depresses prothrombin production. One theory[6] is that dicumarol acts as an "antivitamin," displacing vitamin K in some essential enzyme system. This theory does not explain all the observed phenomena, and it seems probable that one or more factors other than prothrombin are involved in dicumarol poisoning.[1]

Whatever these mechanisms may be, it has been established that feeding of toxic hay will produce the disease in 2-year-old cattle in an average period of 46 days and in yearlings in an average of 15 days.[14] Older stock[5,11,15] and lactating animals[7] are less susceptible.

The clinical signs and postmortem lesions of sweet clover poisoning are well known, although not all descriptions mention that abortions may occur. This outbreak, presumed to be due to sweet clover poisoning, is reported because of the occurrence of the disease in newborn animals without involvement of the adults in the group. Previous reports[12,15] have recorded neonatal affection as a minor incident in herds where adults were chiefly affected.

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The authors thank Dr. B. J. McSherry for estimation of prothrombin and clotting times.

CASE REPORTS

The first case (case 1) occurred on April 4, 1958, in a day-old, male grade Hereford calf. It was born without assistance and appeared normal at birth and for some hours thereafter. When first examined it was recumbent, comatose, dyspneic, the mucous membranes were pale, and there was a swelling from the mandible to the brisket; blood was present in the feces. The animal died while it was being given a blood transfusion. At necropsy, hemorrhages of various sizes were found throughout the body. The dam and all other animals in the herd appeared healthy, although they did show evidence of a nutritional level somewhat below the optimal. A positive diagnosis was not made at this time; traumatic injury was suspected.

The second case (case 2) occurred four days later in the same herd. Upon examining the only other newborn calf in the herd (case 3), it too was discovered to have accelerated heart and respiratory rates and pale mucous membranes.

The syndrome was similar to that which had been seen in newborn animals in a herd with many abortions, stillbirths, and neonatal deaths but in which the dams remained healthy.[10] The outbreak terminated shortly after the herd was changed from an exclusive diet of spoiled sweet clover hay. However, in the current instance it was not readily apparent why a newborn calf should die of sweet clover poisoning while its dam was able to undergo parturition safely. Also, since the owner was certain that he was feeding no sweet clover, other possible causes for the trouble were considered.

The second calf, the more seriously affected of the 2, was brought into the college for further treatment and investigational work. It was given a parenteral coagulant, fluids, and a blood transfusion but died later in the day.

The third calf (case 3) died the next day. Blood samples were drawn from the heart of this calf immediately after its death, and from 3 of the cows in the herd.

On the same day, blood samples were taken from 2 cows and 2 calves in a normal herd.

Clinical Pathology.—Prothrombin time was estimated for all samples using the method of Quick.[16] In the controls, it was 48 sec. or less. Of the animals from the affected herd, 1 had a prothrombin time of 48 sec.; the others, including the dead calf (case 3), were in excess of 15 min. The estimation on the apparently normal cow from the affected herd was not repeated, but there was unquestionably a wide variation between the prothrombin times of the cattle from the problem herd and those of the normal herd.

The blood samples from animals in the affected herd took a minimum of 21 min. to coagulate in 8-mm. tubes,[17] and could still be poured, despite the presence of small clots, after standing in 16-mm. tubes for 1½ hours. Clotting time for normal bovine blood is approximately 6½ minutes.[4]

Postmortem Findings.—In none of the 3 affected calves was there any evidence of external injury. The general picture was that of a hemorrhagic diathesis and the sites of hemorrhage followed the same pattern of distribution. At necropsy all of the animals showed large subcutaneous extravasations of blood over and around all the joints of the limbs, on either side of the spinous processes of the lumbar and thoracic vertebrae, and on the lateral aspects of the ribs—those areas in which there is little tissue between the skin and the underlying bony prominences. All the joint cavities and bursae contained blood or blood-tinged fluid. In the case of the 24-hour-old calf (case 1), a large mass of unclotted blood had collected on the ventral surface of the neck in the region of the external swelling.

The distribution of lesions in the internal tissues was almost identical in the first 2 calves. Each had hemorrhages under the parietal pleurae in the region of the more posterior costovertebral joints, a few ecchymotic hemorrhages in the parenchyma of the lungs, but no hemorrhage in the pleural or pericardial cavities. The third calf (case 3), however, had a large amount of unclotted blood in all three serous cavities. In the abdominal cavities of all 3 calves there were subserosal hemorrhages in the pelvic and posterior abdominal areas, in the region of both kidneys, and from the umbilicus to the vertex of the bladder. The blood in the extravasations was fluid and did not clot even after long exposure to the air.

Histopathologically, the parenchymatous organs had congested blood vessels and relatively few hemorrhages. Some small hemorrhages were present in the lung parenchyma of 1 animal, but in the others the only accumulation of erythrocytes was on the serous surfaces of internal organs and beneath the meninges of the brain. Even in the latter instance the amount of hemorrhage was less than the gross examination would have indicated. This was presumably because the blood failed to clot, then became mixed with cerebrospinal fluid and escaped in the processes of removal and fixation.

Both brains examined showed congestion of the vessels of the pia mater and the intracerebral and choroid plexuses with associated perivascular edema of the brain. The edema was greatest in the white matter of the cerebrum, the white matter and molecular layer of the cerebellum, and in the pons. Only a few hemorrhages were present in the brain tissue and these were located mainly in the pons and cerebellum. There was an associated slight degree of demyelination.

Diagnosis.—The diagnosis was severe hypoprothrombinemia, but the cause was not apparent; a number of known causes[2,4] were considered. The liver and possibly the bone marrow are the source of prothrombin, and liver damage can cause hypoprothrombinemia. The livers of these calves appeared normal. A dietary deficiency of vitamin K seemed improbable; neither prolonged high-level dosing with salicylates, nor prolonged dosing with bacteriostatic drugs active against the flora which synthesize vitamin K, had occurred. There was no evidence of obstructive jaundice which might have led to hypovitaminosis K because of the need for bile salts in the absorption of the vitamin.

Some intestinal diseases, including ulcerative colitis, may cause hypoprothrombinemia, probably as a result of impaired vitamin K absorption, but there was no evidence of intestinal disease in these calves. Occasionally a congenital hypoprothrombinemia occurs which is not well understood. The hereditary form was possible, but since none of the calves were related, this seemed most unlikely.

In the newborn mammal, a transient

hypoprothrombinemia of about one week's duration appears to be normal, probably because the small vitamin K reserve is exhausted before the intestinal flora, which later synthesizes adequate amounts of the vitamin, becomes established. In itself this explanation was inadequate. The ingestion of warfarin or one of several less common anticoagulants such as marcoumarin causes severe hypoprothrombinemia. Of these, only warfarin is at all likely to find its way into cattle feed, and intensive questioning of the owner seemed to eliminate this as a possibility.

At this stage of the investigation, the owner decided that he had been feeding a little sweet clover, although he maintained that none had been fed for at least two weeks. Inspection of his hay loft revealed a large amount of sweet clover in a mixed hay store and it was evident that appreciable amounts were being fed.

Treatment.—Only 1 more cow was due to freshen in the period before a change in feed could be effective. This cow was given vitamin K in the form of menadione sodium bisulfite (100 mg.) by mouth, for two days. She freshened at 11:00 p.m. the second day and at midnight her calf (case 4) was given 15 mg. of the same preparation, intramuscularly. This proved inadequate as the owner reported the next afternoon that the calf was becoming weak. It was given 500 ml. of citrated blood at 5:00 p.m. that day and recovered without further treatment.

DISCUSSION

It is known that dicumarol will pass the placental membrane.[7] It is postulated that these cases developed when subclinical sweet clover poisoning was exacerbated by the transient hypoprothrombinemia of the newborn. This could explain why a cow that is able to withstand the seemingly hazardous procedure of parturition, without excessive bleeding, may give birth to a calf which will die in a few hours as a result of a defect in the clotting mechanism.

The observation that stillbirths and abortions may occur in similar circumstances, with the fetuses having well-marked hemorrhagic lesions, may seem to make this theory inadequate since a fetus obviously is not affected by hypoprothrombinemia of the newborn. However, it has been commonly observed that older animals are less susceptible. It seems, therefore, that had the sweet clover diet been continued, stillbirths and abortions might have been the next stage in the clinical picture, followed by typical cases of sweet clover poisoning in the yearlings and more mature stock.

Fourteen days after the sweet clover was eliminated from the diet, the prothrombin time for 4 cows in the herd was reduced to 39 sec. or less, comparable to that of animals in the normal herd.

The blood given to the first calf was obviously of no value, as it was obtained from a cow in the same herd. This is one more reminder that diagnosis should precede treatment.

It is uncertain why the vitamin K therapy was unsuccessful in case 4. This treatment is said to be effective in human infants if the vitamin is given to the child or to the mother early in labor.[8] However, large doses are necessary and the dosage used in this case may have been inadequate. Oral doses of 1½ Gm. of menadione sodium bisulfite have been successful in treatment of sweet clover poisoning in cattle.[9] There is, however, a time lag between establishment of normal prothrombin time and normal clotting time, and in advanced cases, transfusions are probably necessary.

The complexity of the problem suggests other factors. More than a simple vitamin K deficiency is suspected in hemorrhagic disease of the human newborn.[1,8] The complicating factors are believed to include a deficiency in the factor or factors promoting conversion of prothrombin to thrombin and an increased capillary fragility. It has also been hypothesized that vascular damage may play a part in sweet clover poisoning.[8,14] However, in the cases reported here, the somewhat restricted distribution of hemorrhages does not support the theory of a generalized, increased capillary fragility.

Although the exact mode of excretion of dicumarol appears to be unknown,[7] the process is not a rapid one and repeated doses of vitamin K, blood, or of both, may be necessary in severe cases. A period of at least ten days after a change in feed is recommended before surgical procedures are attempted.

SUMMARY

A condition is described in which apparently normal calves were born without

assistance but died of a hemorrhagic diathesis within a few hours of birth; the dams and the rest of the herd were unaffected. The condition is believed to have been sweet clover disease.

References

[1]Almquist, H. J.: In "The Vitamins." Vol. II. Academic Press Inc., New York (1954): 433-435.
[2]Best, C. H., and Taylor, N. B.: The Physiological Basis of Medical Practice. 6th ed. Williams and Wilkins Co., Baltimore (1955): 119-121.
[3]Campbell, H. A., and Link, K. P.: Studies on the Hemorrhagic Sweet Clover Disease. IV. The Isolation and Crystallization of the Hemorrhagic Agent. J. Biol. Chem., *138*, (1941): 21 (as cited by Goodman, L. S., and Gilman, A.: The Pharmacological Basis of Therapeutics. 2nd ed. MacMillan Co., New York (1956): 1509).
[4]Dukes, H. H.: The Physiology of Domestic Animals. 6th ed. Comstock Publishing Co., Ithaca, N.Y. (1947): 59.
[5]Gibbons, W. J.: In "Diseases of Cattle." American Veterinary Publications Inc., Evanston, Ill. (1956): 516-517.
[6]Goodman, L. S., and Gilman, A.: The Pharmacological Basis of Therapeutics. 2nd ed. MacMillan Co., New York (1956): 1510.
[7]Goodman, L. S., and Gilman, A.: The Pharmacological Basis of Therapeutics. 2nd ed. MacMillan Co., New York (1956): 1512.
[8]Goodman, L. S., and Gilman, A.: The Pharmacological Basis of Therapeutics. 2nd ed. MacMillan Co., New York (1956): 1510-1520 and 1747-1751.
[9]Hodge, F. A., Hamiota, Manitoba: Personal communication, 1958.
[10]Lawson, G. A., Shoal Lake, Manitoba: Personal communication, 1956.
[11]Reinertson, O., and Bohmker, F. A.: Sweet Clover Disease. Allied Vet. (May-June, 1958): 19.
[12]Roderick, L. M.: Sweet Clover Disease. J.A.V.M.A., *74*, (1929): 314-324.
[13]Roderick, L. M.: Am. J. Physiol., *96*, (1931): 413 (as cited by Almquist, H. J.: In "The Vitamins." Vol. II. Academic Press Inc., New York (1954): 433-435).
[14]Roderick, L. M., and Schalk, A. F.: Studies on Sweet Clover Disease. Tech. Bull. 250, North Dakota Agric. Exper. Sta., 1931 (as cited by Gibbons, W. J.: In "Diseases of Cattle." American Veterinary Publications Inc., Evanston, Ill. (1956): 516).
[15]Schofield, F. W.: Damaged Sweet Clover: The Cause of a New Disease in Cattle Simulating Hemorrhagic Septicemia and Blackleg. J.A.V.M.A., *64*, (1924): 553-575.
[16]Todd, J. C., and Sanford, A. H.: Clinical Diagnosis by Laboratory Methods. 2nd ed. W. B. Saunders and Co., Philadelphia and London (1950) 180.
[17]Todd, J. C., and Sanford, A. H.: Clinical Diagnosis by Laboratory Methods. 2nd ed. W. B. Saunders and Co., Philadelphia and London (1950): 178.

Sweet Clover Poisoning in Swine

In August, 1958, during a dry period when forage was scarce, 12 of 30 sows on a farm in Yugoslavia became ill. They were listless and anorectic but had no fever and only a slightly increased rate of pulse and respiration. Dark blue patches scattered over their bodies, especially near the feet, proved to be due to subcutaneous hemorrhage. Two sows showed hemorrhage from the nostrils and 1 from the vagina. Death occurred in four to five days. Necropsies revealed extensive hemorrhages in the body cavities—also anemia. Bacteriologically, all material was negative. The sows not on pasture did not become ill.

Affected sows recovered when given 3 daily doses of 10 cc. of a vitamin K preparation. Since the sows could not be kept out of the pasture, vitamin K was given to all of them as a preventive measure as long as the sweet clover was blooming, and no further poisoning occurred. No previous reports about such poisoning in swine were found.—*Vet. Glasnik, 13, (1959): 61.*

Bracken Poisonous Agent Extracted

A toxic principle which produced clinical bracken poisoning in a calf has been extracted in boiling water from the bracken fern. The toxic agent is apparently stabilized by heat, possibly by destroying an enzyme or other agent which would inactivate the toxin.—*W. C. Evans et al. in Brit. Vet. J. (March, 1959): 83.*

Copper Deficiency Affects Wool

Wool consists mostly of protein but must have a minimum of copper content. The crimping of wool is due to its structure of having a hard section on the inside of its curves with a soft section on the outside, thus contributing to its remarkable elasticity as a textile fiber.

Copper deficiency results in the growth of wool in a semistraightened form and also affects the surface of the fibers. Its scales are poorly formed, giving the fibers a "steely" sheen, and allowing them to slip over each other during spinning. It causes black wool to become gray or even white. Ewes with steely wool may produce lambs with ataxia, due to the deficiency.

The deficiency may be corrected by top-dressing pastures or by adding copper sulfate to salt; however, to avoid copper poisoning, not more than ½ lb. of copper sulfate per week per 1,000 sheep should be made available.—*J. Agric. South Austral. (Jan., 1959): 268.*

Griseofulvin—Another Wonder Drug

Griseofulvin is being hailed as a major "break-through" in the treatment of fungus diseases. An antibiotic isolated from *Penicillium griseofulvum* and other Penicillium species, the new preparation is given orally and will be marketed in this country by two firms.

Some of the initial reports on the efficacy of griseofulvin against fungus infections involve more than the treatment of just a few cases in man. In 200 persons so treated (*see* page 261), the only sign of toxicosis was mild gastrointestinal distress in a minority of the patients, but this disappeared despite continuous treatment.

Infections of many years' duration have responded readily to griseofulvin therapy. It is said that response to therapy depends upon the rate of keratinization and the time necessary for desquamation of keratinized structures.

Investigations conducted so far indicate that all dermatophytic fungi are inhibited by griseofulvin but that deep systemic fungi and bacteria are relatively insensitive to it. The British report on the treatment of ringworm in cattle (*see* JOURNAL, Feb. 15, 1959: p. 168) and Dr. William Kaplan's preliminary report on the treatment of ringworm in cats with griseofulvin (p. 253) will no doubt be the forerunners of numerous articles pertaining to the treatment of animals with this antibiotic.

Practicing veterinarians and physicians alike will hope that continued investigation of griseofulvin will not reveal undesirable characteristics or in any other way dim the promise it now seems to hold forth, and they will welcome this newcomer to the working family of antibiotics.

Need for Research on Equine Diseases

It should surprise no one that the decline in the number of horses has been paralleled by a decrease in the amount of research on equine diseases. The 3 million horses in the United States in 1958 represented a 49 per cent decrease from the previous ten-year average; at the same time, cattle numbers were up 22 per cent, swine 4 per cent, and sheep 3 per cent. Of the total manuscripts published in the *Am. J. Vet. Res.* in its first volume, 1940-41, 13.5 per cent pertained to horses; in 1958, only 1.8 per cent.

Because of the great decrease in the utilitarian value of the horse population, funds for equine research are not easily obtained from the sources regularly supporting research on food-producing animals. Also, many qualified and established investigators do not wish to undertake research projects involving horses. Additional obstacles to research on equine problems are the frequent lack of adequate stabling and the long gestation and maturing periods.

The Grayson Foundation (P.O. Box 364, Lexington, Ky.), a nonprofit organization devoted to the promotion of equine research, recently sent a questionnaire regarding specific research to veterinarians interested in equine practice.

The four problems most frequently indicated by the 89 respondents as being important were: (1) the cause of bone diseases and injuries in young horses; (2) nutritional requirements of the horse; (3) equine influenza; and (4) improved general anesthesia. Veterinarians practicing at race tracks gave highest priority to soundness, general anesthesia, the condition called "tied up," and equine influenza—in that order. Veterinarians doing equine practice other than at race tracks stressed breeding problems and virus abortion. Nutritional requirements were given a high priority by all respondents.

It has been suggested that funds for research on diseases of the horse be raised in part by the horse industry itself. Mr. Clarkson Beard, president of the Grayson Foundation, pointed out that if race track people are to be approached for financial aid, the proposed research must be of benefit to the racing industry. He also expressed the belief that since veterinarians would be making field application of research findings, they should take a leading role in the planning of the work. He seems to have taken the first step; the Foundation is now inviting proposals for the study of unsoundness and nutrition as applied to horses.

If research needs as evaluated by owners and breeders can be correlated with the above survey, the stage would seem to be set for some definite planning and fund raising.

Current Literature

Abstracts

Bovine Gastrointestinal Parasites. XX

In 56 experiments on 14 calves, it was found that daily feeding of small amounts of phenothiazine had no effect on egg production of *Cooperia punctata* but was effective in reducing the number of infective larvae to a low level.

The reduction of egg count levels in some individuals is believed to result from immune reactions rather than the drug, because there is no consistent relationship to the amounts being fed or to the time of the experiment. These animals also proved to be resistant to reinfection.—[*Roy L. Mayhew, B. J. Torbert, and Grover C. Miller: Studies on Bovine Gastrointestinal Parasites. XX. The Results of Feeding Small Amounts of Phenothiazine in Pure Infections of Cooperia Punctata. Am. J. Vet. Res., 20, (May, 1959): 492-497.*]

Eimeria Infection in Rabbits

Evidence of liver damage in sublethal hepatic coccidiosis was determined by serum protein analysis. Comparison of changes in the fresh serum of 42 rabbits indicated a significant ($P<0.01$) increase during infection in both β- and γ-globulins; β-globulins increased on the third day of infection, but most prominently on the thirteenth; γ-globulins increased on the third and seventeenth days. β-lipoproteins increased by the thirteenth day in amount and mobility. Decreases in α-lipoproteins were evident on the thirteenth day; on the twentieth day β and O lipoproteins were very prominent, α-lipoproteins negligible.—[*J. S. Dunlap, W. M. Dickson, and V. L. Johnson: Ionographic Studies of Rabbits Infected with Eimeria Stiedae. Am. J. Vet. Res., 20, (May, 1959): 589-591.*]

Acidosis and Plasma Glucose in Sheep

Sodium butyrate (pH 7.4) and butyric acid (pH 2.0) were infused intravenously and intraruminally into adult female sheep. After butyric acid was given, plasma glucose concentration and CO_2-combining power decreased; but, following administration of the sodium salt, there was no acidosis and the plasma glucose level was increased. It was concluded that acidosis interfered with the glycogenic effect of butyrate. Implications of this were discussed with reference to ruminant ketosis.—[*D. S. Kronfeld, L. A. Campbell, L. L. Hooper, and Sylvia J. Galligan: Acidosis and Plasma Glucose in Sheep Given Butyrate. Am. J. Vet. Res., 20, (May, 1959): 430-433.*]

New Anthelmintic for Sheep

An experimental organic phosphorus compound, 0-methyl 0-(4-tert. butyl-2-chlorophenyl) ethylphosphophoramidothiate (Dowco 105), was found to have marked anthelmintic activity against most species of nematodes in the abomasums and small intestines of lambs. A dosage rate of 200 mg./kg. of body weight gave an over-all anthelmintic efficiency of 93 per cent. When the dose was reduced to 75 mg./kg., anthelmintic efficiency dropped to 55 per cent.

The compound was significantly more effective against the nematodes in the small intestine as compared with those in the abomasum.—[*James R. Douglas, Norman F. Baker, and Paul H. Allen: Trial with a New Organic Phosphate as an Anthelmintic in Sheep. Am. J. Vet. Res., 20, (May, 1959): 442-444.*]

Books and Reports

Reproduction in Domestic Animals

This work is published in two volumes. Volume I, reviewed here, deals with reproduction in the female mammal. Volume II deals with reproduction in the male, insemination techniques, nutrition, fertility, and reproduction in the domestic fowl.

As in many recent works, this text is compiled by several contributing authors. Such a text has many advantages since it permits more rapid publication and greater authenticity, but it is difficult to control symmetry. Chapter I, on the "Anatomy of the Female Reproductive Organs," is little more than a bibliography of recent work. Most chapters are clearly and concisely written but a few lack summation.

The estrous cycle of the cow, mare, ewe, doe, sow, and bitch are discussed. Chapters are devoted to the action of hormones, nervous control, fertilization and development of the egg, implantation, pregnancy, parturition, mammary growth, and lactation.

Unfortunately, the estrous cycle of the cat is not included. It is difficult to argue that the cat is not a major domestic animal when considering the millions of American households in which the cat is found.

The extreme range of the age of puberty might well have been included. Not many veterinarians are going to tell a new owner of a female pup that it is not going to come in heat until it is 10 months old. Many will have produced a litter before attaining this age, in rare cases coming in heat at 5½ months, and often at 6 months of age. The literature records a heifer having calved at 15 months of age. The reviewer has seen many heifers in heat when 7 months old—the text states 9 to 12 months for heifers.

The text, as a whole, is well written and is to be recommended as a valuable addition to the library of any veterinarian.—[*Reproduction in Domestic Animals. By H. H. Cole and P. T. Cupps. Vol. I. 651 pages; illustrated. Academic Press Inc., 111 Fifth Ave., New York 3, N.Y. 1959. Price $14.50.*]—G. W. McNUTT.

THE NEWS

Resolutions Adopted by the XVIth International Veterinary Congress

A considerable number of resolutions were presented to the I.V.C. Permanent Committee at the Madrid Congress. Following are those officially approved and accepted by the Congress:

I. Radiobiology

In view of the increasing impact of nuclear energy and radiobiology upon veterinary medicine and public health, the XVIth International Veterinary Congress recommends that national and international veterinary authorities and institutions should undertake appropriate action with respect to the following fields:

a) The utilization of radioisotopes as research, diagnostic, and therapeutic agents.
b) The use of ionizing radiation in food preservation and its public implications.
c) The measurement and evaluation of environmental contamination with radioactivity from fallout or nuclear accidents with respect to its effects on animals and, via the animal food chain, its effects on man.
d) The undergraduate and postgraduate training of veterinarians to implement these recommendations.

II. Veterinary Medicine

The XVIth International Veterinary Congress draws the attention of national governments to the importance of further researches into the practical application of blood grouping and similar procedures in animals in connection with animal husbandry and disease control.

III. Veterinary Medicine

Attention must be drawn to the increase in animal diseases due to the spread of industry and consequent contamination of the environment by toxic substances. Industrial and hygienic measures should be increased in order to reinforce prophylaxis of these diseases.

IV. Epizootiology

Recognizing the continued need for urgent action to establish further international standards for biological products for veterinary use, the XVIth International Veterinary Congress suggests that the Committee on Biological Standardization of the World Health Organization, in collaboration with OIE and FAO, be encouraged to extend, as soon as possible, its work toward the provision of international standards for additional suitable veterinary substances. Those meriting immediate attention are:

Antitoxins:
Clostridium oedematiens alpha toxin
Clostridium botulinum C and D.
Antiserums:
Swine fever
Toxoplasmosis.
Vaccines:
Anthrax (spore, type Pasteur)
Clostridium welchii B and D
Clostridium botulinum
Clostridium chauvoei
Clostridium specticum
Swine fever
Canine distemper
Newcastle disease
Sheep Pox.

V. Epizootiology

Since it is considered essential that opportunity for regular contact between research workers on foot-and-mouth disease from all regions of the world should be provided, it is recommended that, consistent with the existing arrangements between FAO and OIE, every effort should be made to arrange for regular contacts and distribution of the proceedings of the meetings.

VI. List of Diseases of Animals

The XVIth International Veterinary Congress authorizes the Permanent Committee to publish the "List of Diseases of Animals" as prepared in 1957 by its Subcommittee, subject to the inclusion of various subsequent amendments.

It further resolves that the Secretariat should endeavor to secure firm orders for the list prior to its publication, but that meanwhile arrangements should be made for the printing of a minimum of 2,000 copies.

VII. PUBLIC HEALTH

Recognizing the fundamental contributions of veterinarians to human health through the prevention and control of the zoonoses, and through studies in comparative medicine of human and animal disease inter-relationships in general, the XVIth International Veterinary Congress recommends to national and international health and veterinary authorities:

1) Intensification of activities for the control and, where possible, eradication of the zoonoses.

2) Increased research efforts to clarify newly emerging communicable disease relationships of man and animals.

3) Close collaboration in comparative medical studies on interrelated problems of human and animal health.

VIII. WORLD ANIMAL HEALTH YEAR 1963

Be it resolved that the XVIth International Veterinary Congress proclaim 1963, which will be the 100th anniversary of initiation of the International Veterinary Congresses, as World Animal Health Year, in support of the "Free the World from Hunger Campaign."

The XVIth International Veterinary Congress urges all member countries and various international agencies, such as FAO, WHO and OIE, to increase their efforts to control and eradicate animal diseases that threaten the health and economic well-being of man. The control and eradication of animal diseases is essential for raising the standard of living of man and should receive a high priority in the years preceding the World Animal Health Year.

IX. VETERINARY TEACHING

The XVIth International Veterinary Congress recommends that veterinary schools introduce and develop the training of specialists, particularly in: veterinary public health; inspection and technology of products of animal origin; zootechnics; and nutrition.

Each country will choose the method of specialist teaching most suitable (compulsory or optional, undergraduate or postgraduate) with a view to producing the greatest possible number of specialists.

Iranian Guest of the State Department, Dr. Meymandi, Visits the AVMA

Dr. Mohamed Hessein Meymandi-Nejad, dean, and professor of pathology of the Veterinary College, University of Tehran, Iran, included a visit to the AVMA offices in Chicago within his ten-state itinerary. Dr. Meymandi was a participant in the Foreign Leaders Program of the International Educational Exchange Service of the U.S. Department of State.

Dr. Meymandi's seven-week tour in the United States started May 29 and brought him to the AVMA at the end of June. During his trip, he was able to visit Washington, D.C., Texas, Arizona, California, Washington, Montana, Illinois, Michigan, New York, and Pennsylvania, before leaving for London, July 17.

Dr. Mohamed Hessein Meymandi-Nejad is shown in a relaxing interlude during his visit to AVMA headquarters, in June.

Interested in the American schools of veterinary medicine, Dr. Meymandi particularly observed the curricula and laboratory facilities here. In addition, he purposely included various aspects of the American way of life within his trip.

While in the AVMA offices, Dr. Meymandi reported that the 500 students currently enrolled in the Veterinary College of the University of Tehran will move into new quarters this October. The new facilities will include the various laboratories, clinics for large and small animals, and a 500-acre farm.

Inauguration will take place in November, 1959. Dr. Meymandi indicated his desire to have his American friends and some American institutions represented at the dedication ceremonies of his new facilities. He would especially appreciate these representations to take the form of teaching aids; such as slide collections, books, and periodicals. He feels that assistance of this nature can be as effective and even more lasting than military aid.

Dr. Meymandi, who was elected in 1958 to serve a three-year term as dean of the Veterinary College at the University of Tehran, had at one time been editor-in-chief of the *Veterinary Science Journal* at the University of Tehran, director of information and publication with the Iranian Ministry of Agriculture, and associate professor of veterinary medicine at the University of Toulouse in France.

The author of 83 books, ranging from subjects in veterinary medicine to drama, Dr. Meymandi has also contributed articles to Iranian newspapers. His numerous writings are in Persian and French and have not yet been translated into English.

Part VII

Presidents of Constituent Associations

This is the last segment in our President Series for the year. Of the 50 states and seven Canadian Provinces, only ten failed to supply pictures. They are: Alaska, British Columbia, Colorado, Hawaii, Louisiana, Montana, Nevada, New Mexico, Nova Scotia, and South Dakota.

Since the inauguration of this series, several associations have held new elections. The following ones have come to our attention:

Georgia V.M.A.—J. B. Crane, Valdosta.
Kentucky V.M.A.—O. H. Holler, Madisonville.
Michigan V.M.A.—William Mackie, Lapeer.
Wyoming V.M.A.—Floyd E. Carroll, Green River.

California

Dr. Charles H. Ozanian
(OSU '38)

Prince Edward Island

Dr. James I. Higgins
(ONT '50)

National Assn. of Fed. Vet.

Dr. Roy E. Willie
(STJ '22)

✦ ✦ ✦ ✦

Dr. Helvig Joins National Institutes of Health

U. S. Public Health Service veterinarian, Dr. Raymond J. Helvig (ISC '41), formerly assistant chief, milk and food program, division of engineering services, in Washington, D.C., has recently accepted the position of executive secretary, surgery study section, division of research grants, at the National Institutes of Health in Bethesda, Md.

The surgery study section, whose membership consists of 15 to 20 outstanding research surgeons throughout the United States, serve as consultants to the Public Health Service. It has the primary responsibility for reviewing applicants in the field of surgery for the N.I.H.

Born in Forest City, Iowa, Dr. Helvig received a B.A. degree from St. Olaf College, Northfield, Minn., in 1937; a D.V.M. degree from Iowa State College in 1941; and the M.P.H. degree from the University of Michi-

Dr. Raymond J. Helvig

gan, Ann Arbor, in 1948.

After a few months in private practice in Iowa, in 1941, he accepted an appointment with the Public Health Service and has served continuously with the P.H.S. since then.

Dr. Helvig is president of the American Board of Veterinary Public Health and chairman of the committee on communicable diseases affecting man, International Association of Milk and Food Sanitarians. He is also a fellow of the American Board of Veterinary Public Health.

AMONG THE STATES AND PROVINCES

Alabama

Electrocardiographic Service Offered to Practitioners.—The Scott Canine Research Foundation, at the School of Veterinary Medicine, Alabama Polytechnic Institute, in Auburn, is offering help in electrocardiographic interpretation to interested veterinarians.

To obtain this electrocardiographic service send the E.K.G. tracing to Dr. C. H. Clark or Dr. A. W. Hahn, at Alabama Polytechnic Institute, with complete case histories. The interpretation, diagnostic opinion, and suggested treatment will be promptly returned to you at no charge.

Mr. K. A. Scott began the Foundation in 1955. It is supported by private donations from veterinarians, commercial companies, and others who are interested in canine research. These donations are then matched by Mr. Scott.

The Foundation has confined its investigations largely to that of the canine heart and has prepared a brochure on canine electrocardiography. Other of the Foundation's projects have been devoted to heartworm surgery, angiocardiographic techniques, and heart sounds of the dog in various disease states.

The Foundation invites all interested in individuals to use this service or to contact it regarding any matters concerning electrocardiography.

s/B. F. HOERLEIN, *Head,*
Small Animal Surgery & Medicine.

Illinois

State Association.—The seventy-seventh annual convention of the Illinois V.M.A. met at the LaSalle Hotel in Chicago, Feb. 16-18, 1959.

The scientific portion of the program for the first day included: Drs. A. K. Merriman, Springfield—report of the Division of Livestock Industry; E. J. Wilson, Springfield—federal disease control in Illinois; A. G. Schiller, Urbana—surgical procedures; W. D. Snively, Jr., Evansville, Ind.—fluid therapy; E. A. Majilton, Miami, Fla.—early surgery for cataracts; D. R. Mackey, Greeley, Colo.—feedlot problems of cattle; E. D. Barrows, Cheyenne, Wyo.—range breeding; W. G. Gibbons, Auburn, Ala.—pointers for practitioners; C. A. Brandly, Urbana—veterinary medical extension team; C. B. Hostetler, Des Plaines—cervical test in bovine tuberculosis control; and L. E. Boley, Urbana—abortion in cattle.

The final days of the convention included: Drs. I. M. Paton, Kansas City, Mo.—resistance in bovine mastitis; R. A. Sauter, Omaha, Neb.—swine erysipelas immunization; W. H. Beckenhauer, Lincoln, Neb.—baby pig diseases; D. W. Gregory, Washington, Iowa—edema disease of swine; M. L. Spear, Ames, Iowa—and H. R. Teegarden, Eureka—confinement feeding of swine; F. E. Conner, Morris—leptospirosis; E. I. Pilchard, Urbana—vanishing client in large animal practice; G. W. Hess, Springfield—regulatory veterinarian; W. G. Evans, Springfield—tuberculosis lesions found at slaughter; J. R. Hay, Chicago—regulatory veterinary medicine; V. G. Crago, Youngstown, Ohio—modern approach to practice; E. F. Donovan, Columbus, Ohio—canine nephritis; J. Archibald, Guelph, Ont.—surgery of the urinary tract; H. E. Gill, McCordsville, Ind.—equine practice; and E. E. Slatter, Marion, Ind.—therapeutic nutrition.

Veterinarian of the Year

Dr. Anthony E. Bott (CVC '13), a founder and president of Corn Belt Laboratories, Inc., of East St. Louis, was selected as veterinarian of the year by the Illinois V.M.A.

Dr. Anthony E. Bott

Dr. Bott is past president of the Illinois-Missouri V.M.A., the Greater St. Louis V.M.A., and of the Illinois V.M.A. (1944).

An honorary member of the Cuban National V.M.A. and the Chilian V.M.A., Dr. Bott was also correspondent to the Brazilian V.M.A. in

1954. The same year, he represented the AVMA and the Illinois V.M.A. at the Pan African Veterinary Zootechnical Congress in Algiers.

Dr. Bott served two terms as president of Associated Serum Producers, Inc., was chairman of the Research Planning Committee of Associated Veterinary Laboratories, Inc., and served on the Educational Committee, American Foundation for Animal Health for eight years. One of Dr. Bott's sons, Anthony R. (TEX '44), is also a veterinarian.

Current Roster

The officers of the Illinois V.M.A. are as follows: Drs. A. K. Merriman, Sullivan, president; W. G. Raudabaugh, Piper City, president-elect; C. B. Hostetler, Des Plaines, executive secretary; R. P. Link, Urbana, treasurer.

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Gaines Veterinary Symposium to Be Held in October.—The ninth annual veterinary symposium on "The Newer Knowledge About Dogs" will be held October 14, at Kankakee, Ill., in the Civic Auditorium, under the auspices of the Gaines Dog Research Center, New York.

Dr. C. A. Brandly, dean of the University of Illinois, School of Veterinary Medicine, will again serve as chairman of the program, which will include the following veterinarians: Drs. William Ivens, Jr., Doylestown, Pa.—breeding for a purpose; Frank A. Hayes, University of Georgia—canine ascarids; and George W. Eberhardt, Kansas State University—epilepsy in the dog.

Kansas

Kansas State Announces Winners of Moss Essay Contest.—The three members of the most recent graduating class at Kansas State University to win the annual Moss Essay Contest are: David F. Erwin, Jr., Burden—$25; Curtis L. McCauley, Emporia—$15; and Ernest A. Money, Parsons—$10.

The Moss Essay Contest is a national contest sponsored by the American Animal Hospital Association in which students discuss veterinary ethics. There are three prizes awarded at each veterinary school.

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Dr. Frank Honored at Kansas State University.—Dr. Edward R. Frank (KSC '24) was honored as a distinguished alumnus of Kansas State University at the Gamma Sigma Delta banquet in April.

Receiving a B.S. degree in agriculture in 1918, Dr. Frank obtained a D.V.M. degree in 1924, and in 1929, an M.S. degree from Kansas State College. He engaged in general practice in 1924-1925, was an assistant professor at the University of Illinois, 1925-1926, and an instructor in surgery and medicine at Kansas State from 1926 until becoming a professor there in 1935.

Dr. Edward R. Frank

In 1958, Dr. Frank was an exchange professor at New York State Veterinary College at Cornell University. He is the author of a textbook on surgery which is widely used in U. S. veterinary schools and has contributed many scientific and technical articles. He is internationally recognized as an equine and bovine surgeon.

Both of Dr. Frank's sons are doctors: Gail, an M.D.; and Robert F. (KSC '57), a veterinarian.

s/CARL ROCHAT, *Director, News Bureau, Kansas State University.*

Louisiana

Southwest Association Presents First Veterinarian of the Year Award to Dr. Goodwin.—

Dr. James Arthur Goodwin

Dr. James Arthur Goodwin (KCV '06), of New Iberia, received the first Veterinarian of the Year Award from the Southwest Louisiana V.M.A. on April 5, 1959. Association President, J. N. Thomas, presented the Award.

Dr. Goodwin, who is 82 years old, has been in practice for 53 years. He has served the state board of veterinary examiners for 37 years. A past president of the Louisiana V.M.A. and the Southwest Louisiana V.M.A., Dr. Goodwin has been awarded life membership in both these organizations. In addition, he has been a life member of the AVMA since 1953.

s/ROBERT K. MORRISON, *Secretary.*

Missouri

Greater St. Louis Association.—At a meeting of the Greater St. Louis V.M.A. in February, the following resolution was unanimously passed:

1) Veterinarians to be listed in the Southwestern Bell Telephone Directory to be under the heading "veterinarians." Under this heading it will be permissible to list the following:
   a.—Hospital name with names of staff and attendants. The degrees may be listed if the veterinarian so wishes. Under the hospital name, it is permissible to put:
      1. Specialty, if only one species treated. (example: practice limited to cats).
      2. Office hours.
      3. If no answer, call . . .
   b.—It is permissible to list individual veterinarians and different residences, if desired.
2) The following practices will be contrary to ethics and will not be permitted:
   a.—Double Listings: (example: when the established hospital has only one address it will be listed under this name only.
   b.—Listing under Dog and Cat Hospital.
   c.—Hospital listings under Crematories.
   d.—Hospital listing under Cemeteries.
   e.—Hospital listing under Dog Kennels (this is not to be construed to prevent a veterinarian from listing a kennel).
   f.—Display advertising.
   g.—Bold-faced type.

Recently elected officers of the Association are as follows: Drs. Chester R. Plegge, St. Louis, president; LeRoy N. Atkinson, Kirkwood, vice-president; James R. Seelbach, University City, treasurer; and Edwin E. Epstein, St. Louis, secretary.

s/EDWIN E. EPSTEIN, *Secretary.*

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Veterinary-Nutrition Conferences.—The feed industry committee of the Missouri V.M.A. and the veterinary committee of the Missouri Grain & Feed Dealers Association, in cooperation with the Midwest Feed Manufacturers' Association, planned a series of five district meetings for veterinarians and feed dealers, from July 30 to August 4.

The meetings were held at the following locations in Missouri: Cape Girardeau—July 30; Springfield—July 31; Sedalia—August 1; Kirksville—August 3; and St. Joseph—August 4.

Among the veterinarians contributing to various parts of the series were: Drs. E. G. Bailey, Dexter; James C. McCrea, Platte City; Richard R. Orr, Aurora; Lawrence W. Price, Chicago, Ill.; C. M. Cooper, Kansas City; Ronald E. Baird, Norborne; A. H. Groth, Columbia; and James K. Farrell, Boonville.

s/JAMES C. MCCREA, *Chairman, Feed Industry Committee, Missouri V.M.A.*

New Jersey

Dr. R. A. Hendershott Retires from State's Department of Agriculture.—The retirement of Dr. R. A. Hendershott (OSU '17) who has served as director of the Division of Animal Industry in the New Jersey Department of Agriculture for the past 23 years, was announced recently by the state's secretary of agriculture.

Dr. Hendershott is well known throughout New Jersey for his work in animal disease eradication, particularly tuberculosis and brucellosis of cattle. During his years as

Dr. Ralph A. Hendershott

division director, both of these diseases were brought under control. The state was officially accredited by the U.S.D.A. as a tuberculosis-free area in 1937 and was certified brucellosis-free last year.

Dr. Hendershott joined the staff of the Department of Agriculture in 1926 as head of the newly established Bureau of Animal In-

dustry Laboratory. He served in this capacity for ten years, when he was named division director.

He is a past president of the Veterinary Medical Association of New Jersey, and has served as vice-president and secretary-treasurer of the U.S. Livestock Sanitary Association. He is a member of AVMA and of Phi Zeta. He was recently cited by the Cooperative Inter-Breed Cattle Association of New Jersey for his many years of service to New Jersey's livestock industry. Dr. Brower (see below) succeeded him.

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Dr. Brower Named Division of Animal Industry Director.—Dr. Edwin L. Brower (KSC '30), Freehold, has been appointed director of the Division of Animal Industry, New Jersey Department of Agriculture. He succeeds Dr. R. A. Hendershott, Trenton, who retired on May 15. Dr. Brower's appointment became effective June 4.

The new director has been acting chief of the Bureau of Livestock Disease Control since December, 1958, and has served 22 years with the Department. During most of that time, he was field veterinarian in Monmouth County where he was assigned to the bovine tuberculosis control program. He has also worked in Cape May, Atlantic, and Cumberland Counties.

Dr. Edwin L. Brower

In 1957, Dr. Brower was appointed to the Trenton office staff as chief of the Bureau of Swine Disease Control. Last year, that Bureau was incorporated into the new Bureau of Livestock Disease Control of which he became acting chief.

His New Jersey veterinary experience also includes seven years with Abbotts Dairies where he was in charge of sanitation and the health of the New Jersey herds.

Dr. Brower is a native of Kansas. Currently, he is a member of the Veterinary Medical Association of New Jersey and the Central New Jersey V.M.A. Dr. C. K. Jewell (see below) succeeds Dr. Brower.

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Dr. C. K. Jewell Succeeds Dr. Brower.—Dr. C. Kenneth Jewell (KSC '47), of Basking Ridge, has been named chief of the New Jersey Department of Agriculture's Bureau of Swine Disease Control. He succeeds Dr. Edwin L. Brower (see above).

Dr. Jewell has been a member of the Department's field veterinary staff for 11 years.

North Carolina

Women's Auxiliary.—The Women's Auxiliary to the North Carolina V.M.A. held its annual meeting on June 24, 1959, in the Morehead Biltmore Hotel dining room at Morehead City. Fifty-five members attended.

The Auxiliary's executive board made the following donations: library fund—$25; School of Veterinary Medicine, University of Georgia —$25; College of Veterinary Medicine, Oklahoma State University—$25; AVMA Auxiliary News—$5; AVMA Research Fund—$25; and the AVMA Student Loan Fund—$25.

Newly elected officers are as follows: Mrs. C. J. Lange, Greensboro, president; Mrs. G. R. Armstrong, Charlotte, president-elect; Mrs. G. C. Monroe, Guilford, first vice-president; Mrs. B. H. Staton, Rocky Mount, second vice-president; and Mrs. T. B. Bruce, Raleigh, secretary-treasurer.

Mrs. C. B. Randall, Kinston, was appointed the Auxiliary's delegate to the AVMA Convention in Kansas City for its meeting last August; Mrs. W. D. Collins, Winston-Salem, was alternate. In addition, Mrs. E. G. Batte, Raleigh, was selected as membership chairman.

s/MRS. T. B. BRUCE, *Secretary.*

Pennsylvania

School of Veterinary Medicine at U.P. is Seventy-Five Years Old This Year.—A dinner given last February opened a series of Diamond Anniversary observances to be held during 1959. The School of Veterinary Medicine at the University of Pennsylvania is the nation's second oldest (the school at Iowa State University is the eldest).

Significantly, the School is currently embarked on the most extensive physical development program in its seventy-five year history. The School intends to construct two new buildings at New Bolton Center, its 320-acre site in Chester County, hoping that eventually additional facilities will be erected in West Phila-

delphia. The new center development will cost about $800,000.

The School hopes that a residency training program, such as the one now used to train graduates of human medicine as surgical specialists, can also be inaugurated for graduates in the veterinary curriculum. Forty students will be quartered in the Center which will provide complete living facilities as well as a dining or meeting place for conferences accommodating up to 300 attendees.

Fifty-Ninth Annual Conference

The fifty-ninth annual conference for veterinarians was held under the auspices of the School of Veterinary Medicine at the University of Pennsylvania, Philadelphia, in the Auditorium of the University Museum, April 28-29, 1959.

Among the 20 scientific presentations made during the two-day meeting were: Drs. Jacob E. Mosier, Kansas State College—canine tracheobronchitis; Stephen J. Roberts, Cornell University—ovarian diseases of cattle; Robert W. Kirk, Cornell University—canine pediatrics; Gordon C. Knight, Royal Veterinary College, London, England—thoracic surgery; and David K. Detweiler, University of Pennsylvania—diagnosis of heart disease in horses and cattle.

The symposium on arthritis included: Drs. David S. Grice (M.D.), University of Pennsylvania—etiology and pathogenesis; Charles W. Raker, University of Pennsylvania—in horses; J. Legrande Shupe, Utah State College of Agriculture—in cattle; Jacques Jenny, University of Pennsylvania—in dogs.

A symposium on leptospirosis included the following speakers and their respective subjects: Drs. Maurice W. Hale, University of Georgia—definition of the problem; Theodore Burnstein, Merck, Sharp & Dohme—pathogenesis; Harold Bryan, Upjohn Company—in cattle and swine; Stephen J. Roberts—in horses; Jacob J. Mosier—in dogs; Paul Caedielhac, University of Pennsylvania—diagnosis; and Samuel F. Scheidy, president-elect of the AVMA, University of Pennsylvania—therapeutics and vaccination.

Special Conference Dinner

At a special conference dinner in honor of the School's Diamond Anniversary, Dr. C. D. Van Houweling, of the U.S.D.A.'s Agricultural Research Service, spoke on veterinary medical education in the Soviet Union. He recently made an extensive tour of the veterinary medical faculties in Russia.

He reported that Russia's 34 veterinary schools are graduating 3,500 veterinarians a year, compared to the 17 schools in the United States, which graduate 850 students a year. He added that the quality of instruction was good considering the inadequate facilities they have in their schools.

Soviet veterinarians get from $80 to $135 a month in salary, which increases with experience.

Two Alumni Receive Awards

During the conference dinner, the General Alumni Society of the University of Pennsylvania honored two distinguished alumni of the School of Veterinary Medicine.

Dr. John G. Hardenbergh (UP '16), general consultant to the AVMA, and James A. McCallam (UP '17), Brig. Gen. (Ret.), U.S. Army, AVMA Washington representative, were presented with the Society's Award of Merit, in recognition of their distinguished careers and service to the University.

Alumni Day Program

In June, a special alumni day program was presented as part of the University's commencement week activities, also in conjunction with the School's Seventy-Fifth Anniversary celebrations.

The next observance of the School's three-quarters of a century mark will be held in conjunction with the seventy-seventh annual convention of the Pennsylvania State V.M.A. in the Bellevue-Stratford Hotel, Philadelphia, October 1-3. The official opening of the School in 1884, took place on October 2.

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Bucks-Montgomery Association.—Regularly scheduled meetings of the Bucks-Montgomery V.M.A. were held March 11 and May 13, 1959, at a new meeting place, Lasker Hall at the National Agricultural College, west of Doylestown.

Dr. Robert Burkhart, Allendale, N.J., discussed "Distemper Immunization of the Dog—A Review" at the March 11, meeting. On May 13, Dr. H. A. Milo, director, Pennsylvania Bureau of Animal Industry reported on tuberculosis and Dr. C. J. Hollister, School of Veterinary Medicine, University of Pennsylvania, spoke on leptospirosis.

The Association also held a family picnic on June 27.

s/M. J. DEUBLER, *Secretary.*

Prince Edward Island

Officers of Prince Edward Island Association.—The current roster of the Prince Edward Island Association is as follows: Drs. James I. Higgins, Kensington, president; Maurice H. Clark, Kensington, vice-president; George C. Fisher, Charlottetown, secretary-treasurer; and Wellie Freeburn, O'Leary, registrar.

s/JAMES I. HIGGINS, *President.*

West Virginia

West Virginia University to Hold Symposium.—West Virginia University in cooperation with the Departments of Animal Husbandry, Agronomy, and Genetics will hold a symposium on "magnesium and agriculture," Sept. 3-4, 1959. All sessions will be held at the University in Morgantown, at the Medical Center Auditorium.

Discussions will center around four main areas: magnesium in plants and soils; problems of magnesium assay; magnesium in animals; and so-called "grass tetany" and "winter tetany."

Veterinarians on the program will include: Drs. Franklin D. Custer, Oakland, Md.—winter tetany; Leslie Dozsa, West Virginia University—spring tetany; and Robert R. Marshak, University of Pennsylvania—investigations of tetany in Pennsylvania.

s/D. J. HORVATH (PH.D.), *Chairman, Program Committee.*

VETERINARY MILITARY SERVICE

Fifth Army Headquarters

Lieutenant Colonel Maxey Receives Army Commendation Ribbon.—The Commanding General, Fifth U. S. Army, awarded Lt. Colonel H. C. Maxey (ISC '33), V.C., commanding officer of the Fifth U. S. Army Veterinary Food Inspection Service, the Army Commendation Ribbon, on July 1. The Award was made on the recommendation of Colonel George E. Leone, Medical Corps surgeon.

During the presentation, Colonel Maxey was cited for his outstanding performance as commanding officer of the veterinary food inspection service, during the period December, 1956, to July, 1959. In this capacity, he has been responsible for the inspection of all foods and sanitary inspections of all food-processing establishments in the 13 states which comprise the Fifth Army area.

Colonel Maxey is currently on an assignment at Fort Monroe, Va.

s/COLONEL W. E. JENNINGS, *Correspondent.*

Washington, D.C.

Colonel C. W. Gollehon Joins Veterinary Division Office of the Army Surgeon General.—Colonel Charles W. Gollehon, (OVC '33) V.C., has recently been named chief of the Meat and Dairy Hygiene Branch of the Veterinary Division, Office of the Army Surgeon General in Washington, D.C.

After entering the Army in 1941, Colonel Gollehon was eventually attached to the Army quartermaster depot in Boston, Mass. From 1950 to 1953, he served at the Area Command headquarters in Heidelberg, Germany. He went to the Presidio of San Francisco from 1953 to 1956.

Lieutenant Colonel H. C. Maxey, commanding officer, Fifth U. S. Army Veterinary Food Inspection Service, *U. S. Army Photograph.*
is shown receiving the Army Commendation Ribbon from Colonel G. E. Leone, Fifth U. S. Army Surgeon, in a ceremony, July 1, 1959.
Colonel Leone made the presentation on behalf of Lt. General W. H. Arnold, the Army Commander.

Prior to coming to Washington, D.C., Colonel Gollehon was in the Inspection Division of the Military Subsistence Supply Agency in Chicago, Ill., from 1956 to 1959.

Star indicates member of AVMA

DEATHS

★**Raymond R. Birch** (COR '12), 78, Ithaca, N.Y., widely-known authority on hog cholera, bovine tuberculosis, and brucellosis and for many years on the faculty of the New York State Veterinary College at Cornell University, died on July 26, 1959.

Born March 10, 1881, at Manhattan, Kan., Dr. Birch received a B.S. degree in Agriculture from Kansas State College in 1906 and then went to the Philippine Islands where he was an inspector with the Bureau of Agriculture and a specialist in animal industry for three years. While there, he became interested in veterinary medicine, after witnessing the critical need for animal disease control in the Islands. He then entered Cornell where he received his D.V.M. degree in 1912.

After graduation, he joined the veterinary faculty as superintendent of the veterinary experiment stations and was engaged in hog cholera serum production for a time before

engaging in brucellosis research, an interest that extended over the next 25 years. He rose to the position of professor of veterinary research and continued as superintendent of the experiment station until his retirement in 1939.

He was an International Education Board scholar and studied in Europe in 1926.

Dr. Raymond R. Birch

Dr. Birch served on a number of professional and scientific bodies, notably as a consultant on the International Committee on Infectious Animal Diseases, Marshall Plan countries in 1951-1952, and the World War II Committee on Procurement and Assignment.

In 1949, he received the Borden Award and Medal administered by the AVMA, for his research on brucellosis and on the practical application of his findings in the control of bovine brucellosis.

He was a member of his local and state veterinary medical associations; of the AVMA which he joined in 1913 (he was made a life member in 1958); and of the U. S. Livestock Sanitary Association. From 1928 to 1935 inclusive, he was a member of the former AVMA Committee (now Council) on Education.

★**Harry J. Magrane** (MCK '13), 73, well-known practitioner of Mishawaka, Ind., died on July 12, 1959, in Memorial Hospital, South Bend, following a brief illness. His death came on the forty-sixth anniversary of his opening of practice in Mishawaka where he and his two sons operated the Magrane Animal Hospital.

Born in Chicago, Ill., Dec. 1, 1885, he received his D.V.M. degree from McKillip Veterinary College in 1913. He was in general practice for many years. He was active in the local, state, and national veterinary Medical associations, the American Animal Hospital Association, and was a life member of the Michiana and Indiana Associations and of the AVMA which he joined in 1930. He was also a member of the 12th and 15th International Veterinary Congresses in New York in 1934 and in Stockholm in 1953, respectively.

Among the survivors are his widow and two sons who are veterinarians: Drs. Harry J., II (TEX '43); and William G. (MSC '40).

Joseph Peter Mack (NYS '17), 64, Macon, Ga., died in a local hospital on June 11, 1959.

Born in New York City, Dr. Mack who had retired from service in the U. S. Department of Agriculture, had moved to Macon from Atlanta in 1938.

George I. Smith (WES '99), 88, Sedan, Kan., died May 12, 1959.

Born in Lexington, Mo., Dr. Smith had practiced in Sedan since 1925. He retired from practice five years ago.

Raymond Stigers (CVC '18), 67, St. Paul, Minn., died of a heart attack on June 15, 1959.

Dr. Stigers was born in Stewart, Iowa, raised in Mora, Minn., and had lived in St. Paul since 1930. After graduation, he had practiced in Mora until 1928, when he joined the Minnesota Department of Agriculture.

Perry L. Talbot (CVC '10), 77, Leavenworth, Kan., died at the University of Kansas Medical Center in Kansas City, on May 28, 1959.

A resident of Leavenworth County for 30 years, Dr. Talbot owned and operated a 265-acre farm in Alexandria Township.

Glenn E. Whipple (KSC '11), 72, Omaha, Neb., died from prolonged diabetic complications, May 24, 1959.

After various assignments with the former Bureau of Animal Industry, Dr. Whipple went to Omaha in 1913. In 1918, he helped found Corn States Laboratories, Inc., and served as vice-president in charge of production until his retirement in 1956.

David H. Wolfort, 84, University City, St. Louis, Mo., died of the infirmities of old age, June 5, 1959.

Dr. Wolfort had operated a horse and mule sales company for many years, prior to his retirement ten years ago. Jesse James, had been one of his early customers.

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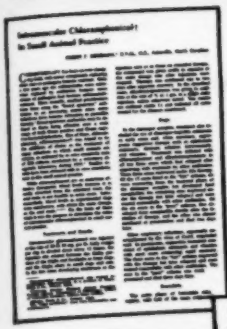
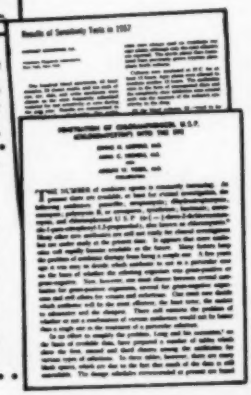


INTRAMUSCULAR CHLORAMPHENICOL IN SMALL ANIMAL PRACTICE
by Robert F. Borgman, D.V.M., M.S.
Reprint, Veterinary Medicine

SALMONELLA BREDENEY INFECTION OF CALVES AND PROPHYLAXIS WITH CHLOROMYCETIN AND STREPTOMYCIN
by J. A. Howarth, D.V.M., Ph.D.; D. R. Cordy, D.V.M., Ph.D.; J. Bittle, B.S.
Reprint, Journal of the American Veterinary Medical Association



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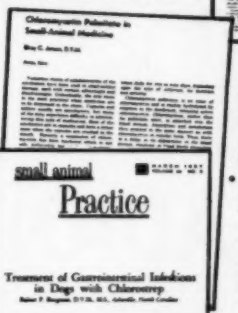

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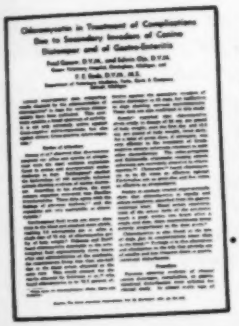

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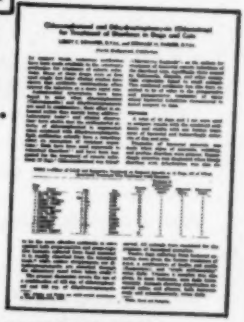
Reprint, Journal of the American Veterinary Medical Association

CHLOROMYCETIN IN TREATMENT OF COMPLICATIONS DUE TO SECONDARY INVADERS OF CANINE DISTEMPER AND OF GASTRO-ENTERITIS
by Fred Gasow, D.V.M., Edwin Oja, D.V.M. and F. E. Eads, D.V.M., M.S.
Reprint, The North American Veterinarian



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In canine tracheobronchitis, FURADANTIN given for 5 days stopped the coughing in 95% of 75 cases; in some dogs, complete symptomatic relief was gained in 48 hours.[3]

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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What Is Your Diagnosis

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below — then turn the page ▶

Fig. 1—Radiograph, lateral view, of the dog's skull.

History.—A female dog the size and with characteristics of a Manchester Terrier was found wandering in circles on a road. The dog, estimated to be 1 year old, was thin and showed evidence of having recently nursed a litter. Her head was "apple-shaped" and an open fontanel was present at the point of bisection of the suture lines of the parietal and frontal bones. A radiograph, lateral view (fig. 1), was taken of the skull.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Hydrocephalus—notice the area of the open fontanel.

Comment.—Hydrocephalus results from an abnormal accumulation of fluid within the system of cerebral ventricles due to interference with the flow and absorption of cerebrospinal fluid. There is no evidence that it occurs as the result of overproduction of cerebrospinal fluid. Under normal conditions, fluid from the lateral ventricles communicates with the third ventricle by means of the foramina of Monro, and then with the fourth ventricle through the two lateral foramen (Luschka), and into the subarachnoid spaces. The excess accumulation of cerebrospinal fluid in the ventricles of the brain at first causes a lasting increase of the intracranial pressure. This gradually becomes greater and causes uniform atrophy and diminution of function of the brain. The dilation of the lateral ventricles is manifested by excessively rapid increase in the size of the head and separation of the cranial sutures.[1]

In hydrocephalus, the mentality is usually so retarded that the animal is either euthanatized or fatally injured before it reaches maturity. It would be of interest to

(Continued on adv. p. 28)

Fig. 2—Radiograph of the skull of a German Shepherd Dog pup with hydrocephalus, in which radiopaque iodine was injected into the cisterna magna (dorsoventral view).

Fig. 3—Radiograph (lateral view) of the pup after radiopaque iodine was injected into the cisterna magna.

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1. Mires, M. H., and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950.

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Fig. 4—Photograph of a crossbred Terrier-type pup with hydrocephalus.

Fig. 5—Photograph of the brain of the crossbred Terrier-type pup pictured in figure 4.

know under what circumstances this dog was raised in order that she survived long enough to whelp and nurse a litter.

The accompanying photographs show this condition in 2 other pups. Radiopaque iodine was injected into the cisterna magna of the German Shepherd Dog pup (fig. 2, 3). Notice that the opaque substance has failed to flow either into the lateral ventricles or into the subarachnoid spaces. The crossbred Terrier-type pup (fig. 4) shows the stance and conformation of the head typical of this condition. Its brain (fig. 5) shows the effect of uniform pressure atrophy due to excess fluid in the lateral ventricles. This results in a retarded nervous response and a lowered intelligence.

Reference

[1]Nelson, W. E.: Textbook of Pediatrics. W. B. Saunders Co., Philadelphia, Pa. (1945): 1054-1056.

This report was submitted by Dr. Arle Schneider, Vicksburg, Mich.

Additional photographs presented by Drs. Myron Bernstein, Glencoe, Ill., and Wayne H. Riser, Skokie, Ill.

Drs. J. O. Knowles and H. B. Roberts Elected to Executive Board in Districts III and IV

DISTRICT III (Southeastern States and Puerto Rico)

In balloting completed July 2, 1959, in District III, Dr. J. O. Knowles, Miami, Fla., was elected to the AVMA Executive Board for a six-year term, commencing with the close of the 1959 Annual Meeting in Kansas City. He succeeds Dr. McKenzie Heath, who represented the District for the past two years, having been elected to fill out the term of the late Dr. R. S. Sugg.

Dr. J. O. Knowles

Dr. Knowles is a graduate of the University of Pennsylvania, class of 1938. During World War II he served as an Air Force veterinarian, and after he was discharged with the rank of Major, he went into private practice in Miami, Fla., with his father, the late Dr. A. T. Knowles, and brother, Dr. R. P. Knowles.

He has been a member of the AVMA House of Delegates for the past eight years, and was chairman of the Advisory Committee during the 1958-1959 term. Dr. Knowles was president of the South Florida V.M.A. in 1955, and was chairman of the Section on Small Animals at the AVMA Convention in Minneapolis in 1955.

In addition to AVMA activities, Dr. Knowles is a member of the A.A.H.A., the New York Academy of Science, and is currently on the executive committee and the examinations committee of the National Board of Veterinary Medical Examiners. He was chosen "Veterinarian of the Year" in 1956.

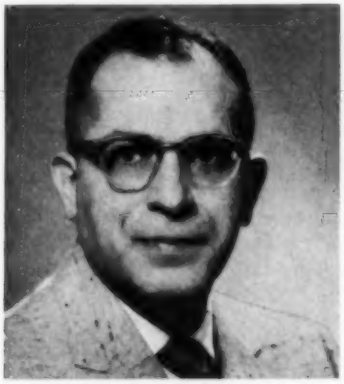
As a private practitioner, he was selected to represent the AVMA at the hearing of the Committee on Finance of the U.S. Senate with respect to the Self-Employed Individuals' Retirement Act of 1959 (see JOURNAL, Aug. 15, 1959, adv. p. 34).

DISTRICT IV (Kentucky, Michigan, Ohio, and West Virginia)

Dr. Harry B. Roberts, Cleveland, Ohio, has been elected Executive Board member from District IV, for a six-year term. He succeeds Dr. Wade O. Brinker, East Lansing, Mich., who has represented the District since 1955.

A graduate of the College of Veterinary Medicine at Ohio State University, class of 1933, Dr. Roberts entered private practice the following year in Cleveland, Ohio, in partnership with Dr. Clifford C. Wagner. In 1948, Dr. Wallace E. Wendt joined the two veterinarians, and today Drs. Roberts, Wagner, and Wendt enjoy the oldest partnership practice in the state of Ohio.

Dr. Roberts served for many years as secretary and president of the Cuyahoga County V.M.A. and as chairman of various Ohio State V.M.A. committees. In 1955, he was president of the Ohio State V.M.A. He received the Ohio State V.M.A. award for "Outstanding Professional and Public Service" in 1956. He was co-general chairman of the Committee on Local Arrangements for the 1957 AVMA Convention in Cleveland.



Dr. Harry B. Roberts

Dr. Roberts has maintained an active interest in his alma mater, and has been presented with honorary memberships in Alpha Psi and Omega Tau Sigma professional fraternities.

A member of the Veterinary Medical Board of Ohio for the past five years, he is currently serving as president of that body, and has represented the veterinary profession in many public and civic enterprises.

Drs. Robert E. Storm, D. W. Anderson, and C. B. Hostetler served as tellers on July 21 and certified the foregoing results of the elections in the two districts.

Public Relations

New Explorer Scout Program

A new movement in scouting is being developed and tested by the National Council of the Boy Scouts of America in New Trier Township, north of Chicago. For three years, a program for older boys—high school freshman and sophomores in particular—called Explorer Scouts, has been under development.

On May 27, questionnaires were circulated to 940 boys in classes at New Trier High School. Each questionnaire asked the boys to choose their first and second interest in a list of ten subjects. Veterinary medicine was listed under a classification of "animals," which appeared at the head of the list. Of the 940 questionnaires, 501 were filled out and returned. Nineteen of the respondents listed animals and veterinary medicine as their first choice. Six indicated veterinary medicine or medicine as their intended career.

The questionnaire announced that if a sufficient number of students were interested in a certain subject, they would receive an invitation in September to join an "Explorer Post." Experts and sponsors were promised for meetings, field trips, or workshops, which would meet once or twice a month.

Because of the interest in veterinary medicine and the location of the pilot area, the Chicago Veterinary Medical Association will provide the "experts" for explorations in veterinary medicine.

Suggested explorations include a field trip to the Chicago Union Stockyards, where the Illinois state meat inspector will show them what veterinary meat inspectors look for in food animals before and after slaughter. A zoo veterinarian will take a group behind the cages to see baby animals, and see how new animals are quarantined to protect the rest of the zoo population.

Visits to animal hospitals, diagnostic laboratories, college veterinary science departments, research laboratories, veterinary pharmaceutical manufacturers, Veterinary Corps installations, veterinary clinics, and meetings are planned to expose the explorers to every facet of veterinary medicine within a day's travel of New Trier Township.

At other meetings, veterinarians will be speakers and films will be shown.

The high school boys will be expected to contribute projects of benefit to the profession. Suggested projects include the encouragement of younger scouts to try for merit badges in areas touching veterinary interest and to assist the younger boys in earning them.

Other possible projects include the construction of exhibits for display at school science fairs and in public libraries during October, Science Youth Month; Farm-City Week and at career days; and public health and agricultural fairs.

The new Exporer Scout program is designed to permit older boys to explore their interests with the guidance of experts in industry and the professions, and through trade and professional organizations. Their contributions to projects of benefit to the "expert" group will serve to make them active participants in the program.

As the pilot program develops, the National Scout Council will expand the program to set up Explorer Scout posts across the nation. Material developed by the Chicago V.M.A. will be available to enable other veterinary organizations to take advantage of this new opportunity for advancing veterinary public relations.

How Long Can He Hold Out?

Remember the story of the "Hero of Haarlem" from the book of Hans Brinker by Mary Mapes Dodge? The story relates how an eight-year-old boy discovered water trickling through a hole in the dike, and to save the townspeople of Haarlem he placed his finger in the hole until a clergyman happened by, after spending the night with a sick parishioner, and summoned aid.

Imagine what would have happened if someone had not come to aid our young hero. Perhaps the entire town of Haarlem would have perished. Who's going to come to the aid of the Independent Wholesaler? How long can he hold back the pressure of the accelerated competition of the large corporate giants? He wants to stay in business and continue to offer you his personalized service, but he needs your support to do it.

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History of the AVMA

1867

The meeting for 1867 was held at the New York College of Veterinary Surgeons. A revision of the Constitution was adopted, and Drs. C. M. Wood, Stickney, Thayer, and Large were appointed "to review and revise the transactions of the past and future."

Just how the transactions of the future were to be revised is not stated, but the purpose in reviewing those of the past appears to have been in anticipation of publishing the transactions of the Association to that date. Whether or not this was done seems not to be on record, but the following year, the matter was put in the hands of the Committee on Intelligence and Education.

The transactions of 1863, however, were published. In 1905, Alexander Eger, the veterinary book publisher, presented the editors of the *American Veterinary Review* with a bound copy of the Constitution and Bylaws of the U.S.V.M.A., printed in 1863, and acquired by him through the purchase of the library of the late J. H. Stickney, first president of the Association. It is most unfortunate that the book was not presented to the Association. At the time, the *Review* was a private publication, and there is no record of what properties were included with the purchase of the *Review* by the Association in 1915, whereupon it became the present JOURNAL. As the first item of its kind, the 1863 transactions would be a priceless memento of the founding of the Association.

At the meeting, Alfred Large and Alexandre Liautard reported on the horse disease existing on Long Island, which they termed cerebro-spinal meningitis—probably forage poisoning, which later sporadically reached alarming proportions in the Midwest and South as the "horse plague." C. M. Wood read a paper on scrotal hernia.

Elected as the new slate of officers were: Robert Wood of Massachusetts, president; John F. Budd of New Jersey, secretary; and E. F. Thayer of Massachusetts, treasurer.

Reversing the earlier practice of having several vice-presidents from the several sections of New England and the Middle Atlantic states, William Wisdom, patriarch of the group, was made the sole occupant of this office. Wisdom had been a practitioner in Delaware for nearly 30 years when, in 1859, he matriculated at the Veterinary College of Philadelphia, along with Jacob Dilts of New Jersey. Dilts was a graduate of the Boston Veterinary Institute and one of the charter members of the U.S.V.M.A.

Flyleaf of the minute book, with original copy of Constitution and Bylaws of the U.S.V.M.A. shown on the left.

While it is a fair assumption that only the more progressive practitioners would have been interested in the objectives of the Association, it is also evident that the group exercised good judgement in electing only the more able men to high office. Representative of the group content to follow rather than lead, was William Saunders, whose father had been a farrier for one of the stage lines in Massachusetts. The younger Saunders took private students—apparently a lucrative practice at the time—but was characterized as being "not fond of reading nor of studying, and in his professional life depended largely on his experience to carry him through . . . . He had commercial faculties largely developed, and always had a large business."

✦ ✦ ✦

R. H. CURTIS, M.R.C.V.S., fourth president of the U.S.V.M.A., was a London graduate who practiced in Brooklyn in the 1860's. He also ran a riding school, "a thing which in those days was peculiar, as horseback riding was only in its infancy in that part of the state."

He was characterized as "a kind, genuine gentleman," whose overpowering joy in life was his nephew, Alfred Large, whom he adopted as a son and who later became president of the Association—as close to a father-son combination ever realized for this office.

Since he was in his later years at the time of the organization meeting, Curtis perhaps had less opportunity to distinguish himself in Association matters than others accorded the presidency. Apparently in ill health, he resigned from the Association in 1868—a year following his tenure—whereupon he was made the first honorary member of the U.S.V.M.A. He died in 1869 "at quite an old age."

COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

Colorado Veterinary Medical Association. Annual convention. Shirley Savoy Hotel, Denver, Colo., Sept. 3-4, 1959. Gail H. Gilbert, 5500 Wadsworth Ave., Arvada, executive secretary.

West Virginia University. Symposium in magnesium and agriculture. West Virginia University, Medical Center Auditorium, Morgantown, W. Va., Sept. 3-4, 1959. D. J. Horvath, program committee chairman.

Electron Microscope Society of America. Seventeenth annual meeting. Ohio State University, Columbus, Sept. 9-12, 1959. Sydney S. Breese, Jr., Plum Island Animal Disease Laboratory, Greenport, L.I., N.Y., program chairman.

New York State Veterinary Medical Society. Annual meeting. Grossinger's, Grossinger, N.Y., Sept. 16-18, 1959. F. H. Fox, chairman.

South Dakota Veterinary Medical Association. Annual meeting. Sheraton-Johnson Hotel, Rapid City, S. Dak., Sept. 17-18, 1959. Glenn E. Duncan, Tyndall, secretary.

New Mexico Veterinary Medical Association. Annual meeting. Western Skies Hotel, Albuquerque, N. M., Sept. 21-22, 1959. E. R. Leslie, 907 Alamosa, Carlsbad, N.M., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. (Combined with the University of Pennsylvania School of Veterinary Medicine's Seventy-Fifth Anniversary celebration). Bellevue-Stratford Hotel, Philadelphia, Pa., Oct. 1-3, 1959. R. C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Eastern Iowa Veterinary Association, Inc. Forty-sixth annual meeting. Roosevelt Hotel, Cedar Rapids, Oct. 15-16, 1959. C. B. Thayer, Medical College, State University of Iowa, Iowa City, Iowa.

Interstate Veterinary Medical Association. Annual meeting. Sioux City, Iowa, Oct. 22-23, 1959. Dr. Don Rubel, 3209 38th St., Sioux City, secretary.

Animal Care Panel. Annual Convention. Sheraton Park Hotel, Washington, D.C., Oct. 29-31, 1959. William I. Gay, Animal Care Panel, 2101 Constitution Ave., Washington 25, D.C., publicity committee chairman.

Southern and West Virginia Veterinary Medical Associations. Combined meeting. Lord Baltimore Hotel, Baltimore, Md., Nov. 1-4, 1959. A. A. Husman, P. O. Box 91, Raleigh, N. Car., secretary, Southern V.M.A., and H. J. Fallon, 200 5th St., W. Huntington, W. Va., secretary, West Virginia V.M.A.

Missouri, University of. Thirty-fifth annual veterinary conference. University of Missouri, School of Veterinary Medicine, Columbia, Nov. 2-3, 1959. Cecil Elder, chairman.

Veterinary-Nutrition Conference. Second annual meeting. President Hotel, Kansas City, Mo., Nov. 30—Dec. 1, 1959. This conference is sponsored jointly by the Iowa, Kansas, Missouri, and Nebraska Veterinary Medical Associations and the Midwest Feed Manufacturers' Association.

United States Livestock Sanitary Association. Sixty-third annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 15-18, 1959. R. A. Hendershott, 33 Oak Lane, Trenton, N.J., secretary.

Foreign Meetings

International Association of Veterinary Food Hygienists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A. the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant 6th and I Streets, Anchorage, Alas. Lt. Colonel E. H. Akins, Surgeon's Office, U.S.A.R.A.L., Fort Richardson, Alas., secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. J. W. Langley, Jr., P.O. Box 5013, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

Kern County Veterinary Medical Association, the first Thursday evening of the month. James L. Frederickson, 17 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the

third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. Andrew F. Giambroni, P. O. Box 782, Red Bluff, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. T. J. Carleton, 325 W. Lockeford St., Lodi, Calif., secretary-treasurer.

Orange Belt Veterinary Medical Association, the second Monday of each month. R. Y. Foos, P.O. Box 955, Victorville, Calif., secretary-treasurer.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Wednesday of the month. E. C. Story, 4819 "V" St., Sacramento 17, Calif., secretary-treasurer.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., sceretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. Dr. James Voss, Veterinary Hospital, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Tallahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg, Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Hillsborough County Veterinary Medical Society, the second Monday evening of each month. For additional information as to the location of each meeting, contact: J. J. Metz, Jr., 5207 Nebraska Ave., Tampa 3, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodson's Restaurant, Stephen C. Hite, 5807 105th St., Jacksonville 10, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

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Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwanee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., Plainfield, Ind., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, P.O. Box 183, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month except June, July, and August at 6:30 p.m., Breeze House, Ankeny, Iowa. S. L. Hendricks, secretary-treasurer.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

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East Central Iowa Veterinary Medical Society, the Second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, P.O. Box 162, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, 202 S. Stone St., Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. W. A. Danker, Dows, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

LOUISIANA—New Orleans Veterinary Medical Association, the third Thursday of every month at the Monteleone Hotel, New Orleans, at 8:30 p.m. Ronald C. Francis, 6421 Chef Menteur Highway, New Orleans, La., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

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MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

South New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Marvin Rothman, 718 Dwight Ave., Collingswood, N.J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, the third Wednesday of each month,

(*Continued on adv. p.* 41)

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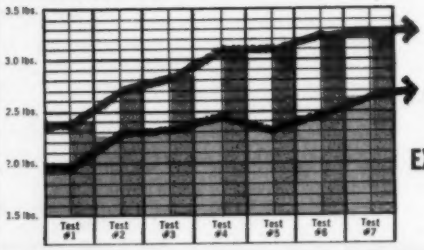

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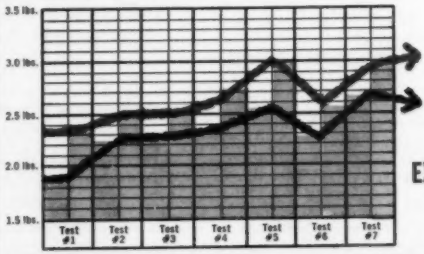

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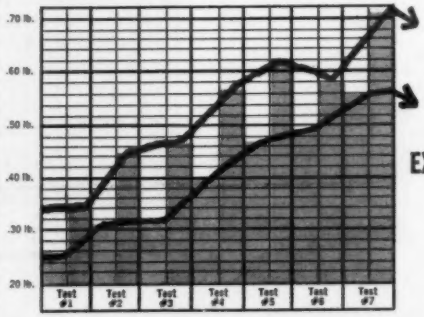

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NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Caroline Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Viiu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, 451 E. Galbraith Rd., Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, 3120 Valley View Dr., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, 8208 Carnegie Ave., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, 6941 Far Hills Ave., Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. C. Gale, Wooster, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the Fourth Tuesday of each month, at 9:00 p.m. Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. T. E. Messler, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSLYVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

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VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwestern Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1109 E. LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Raymond Pahle, 10827 W. Oklahoma Ave., Milwaukee, Wis.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

A Breeding Record for a Sow

A record for prolificacy is claimed for a 7-year-old "Middle White" sow in Britain. She has farrowed a total of 139 pigs and raised all but 2 of them. The previous claim to this record was 122 pigs from 10 litters from a Wessex sow in 1949.—*Vet. Rec. (May 2, 1959): 278.*

Instructions to Authors

JOURNAL *of the AVMA*

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals, which is ethical publication procedure.

Manuscripts.—Manuscripts, including **footnotes, references,** and **tables,** must be typewritten, **double-spaced,** on 8½- by 11-in. bond paper, and the original and one carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise. Short, simple sentences are clearer and more forceful than long, complex ones.

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Drawings, graphs, and charts should be made clearly and accurately in India ink on white paper and a glossy print of them submitted when possible. Numbers or letters appearing on graphs or charts should be large enough to allow for any reduction necessary for the chart or graph to fit JOURNAL pages. Blue lines in graph paper drop out in reproduction; therefore, if lines are required they must be drawn in black ink. All illustrations should bear the name of the author and the illustration number on the back.

Tables.—Tables should be simple and typed **double space.** Complex tables are not conducive to perusal. It is wiser to summarize complex material than to tabulate it.

References.—References should be typed **double space,** in alphabetical order, and should be prepared in the following style: name of author, title of article, name of periodical with volume, year, and page numbers. References to journals not commonly known should give the complete name of the periodical, and where published so that they may be added to our reference files. When books are cited, the name of publisher, location, edition, and year should be given.

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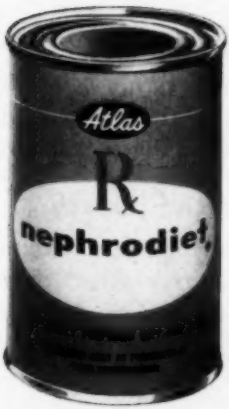

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Age, Radiation, and Sterility

In mice, the effects of radiation vary markedly according to the stage of development of the ovary. Female mice given 300 roentgens (r) of x rays on the day of birth were not greatly affected. Adult females given the same dose never produced more than two litters afterward. A dose of 50 r to an adult was more damaging to fertility than 300 r was to newborn mice. However, if exposed during the second week after birth, at the time when immature reproductive cells have just reached the stage in which they will remain throughout most of their adult life, the mice will seldom produce more than one litter.

In the human female, this stage of ovary development apparently occurs before birth so that radiation could cause sterility in the human fetus.—*Sci. News Letter (May 16, 1959): 310.*

Aphids and Photosensitization

A few years ago, it was reported that photosensitization of animals in New Zealand was prevalent in areas where the growing forage was badly infested with aphids. The term "aphis disease" was used for the animal affliction. This summer, several varieties of aphids (greenbugs) are common in the western cornbelt states (*Farm J.*, July, 1959: p. 50) where they have ruined many fields of oats. It would be interesting to know if any cases of photosensitization have occurred in animals grazing on these fields while the aphids are present.

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Research veterinarian—progressive manufacturer of feed medications and veterinary products with national distribution desires veterinarian as part of its expansion program to conduct therapeutic studies and critical evaluation tests. Advanced degree and some experience is preferred but not required. Please submit detailed resume. Address Box P 7, JOURNAL of the AVMA.

Wanted—veterinarian as assistant in midwestern small animal practice. Give details regarding experience, family status, references, address, etc. Address Box P 10, JOURNAL of the AVMA.

Veterinarian desired for station veterinarian position, North Carolina State College. Service obligation is veterinary care of college herds. Graduate study opportunity leading to M.S. degree. Position pays $5,400 per annum. Contact Dr. E. G. Batte, Box 5658, State College Station, Raleigh.

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Wanted—Positions

Young, ambitious Cornell '57 graduate, returning from the service this October, desires position in New York state small animal hospital, leading to permanent future. Have experience. Address Box M 11, JOURNAL of the AVMA.

Veterinarian with 17 years experience in general practice desires entering commercial field. Administration, production, or public relations preferred. Address Box P 2, JOURNAL of the AVMA.

Woman veterinarian, 10 years small animal experience, desires position in New York or Connecticut. Suburban area preferred. Address Box P 4, JOURNAL of the AVMA.

Graduate of AVMA-approved school, experienced, desires position with small animal practitioner leading to eventual partnership or purchase. Military obligation to be completed soon. Excellent references. Address Box P 8, JOURNAL of the AVMA.

Veterinarian's assistant—any location. Woman, age 43, several years experience veterinary hospitals, 20 years raising and breeding Boxers, wants position with veterinarian. Prefer living on premises. Mrs. Cecil G. Cross, Box 53, So. Ft. Mitchell, Ky.

Veterinarian desires position in public health work after ten years in practice, two years in military public health work. Desirous of eventually obtaining M.P.H. degree. Address Box P 11, JOURNAL of the AVMA.

Experienced veterinarian (OSU graduate) desires position with or purchasing interest in group practice. Ten years owning own practice. Licensed in Ohio, Pennsylvania, Florida. Address Box P 12, JOURNAL of the AVMA.

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Two experienced veterinarians are seeking to lease or buy small animal hospital in Chicago or suburbs. Address Box M 34, JOURNAL of the AVMA.

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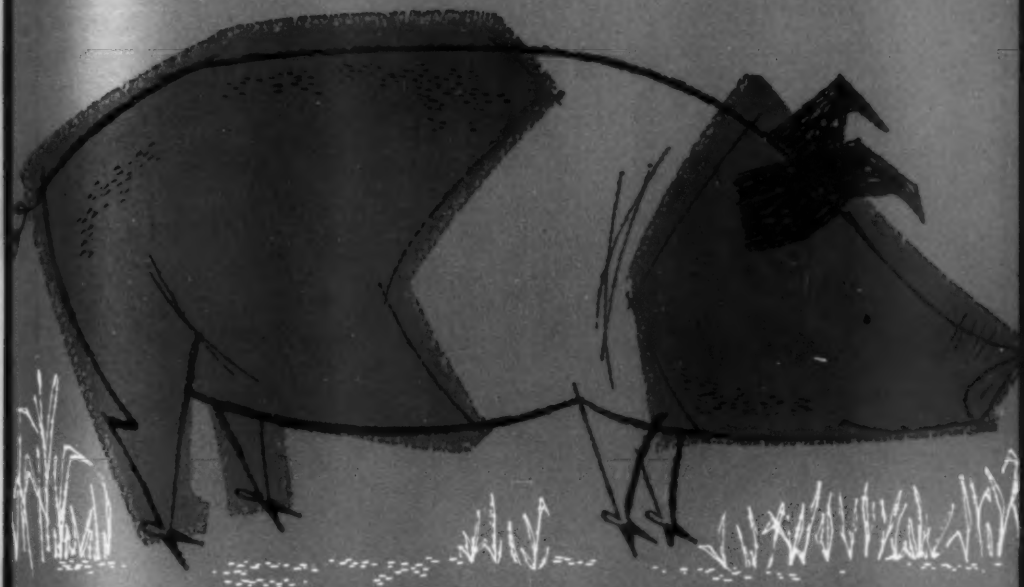

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